Reed, Angel

From: Harrigan, Sandra
Sent: Thursday, May 14, 2009 4:32 PM
To: Tanya M Amme; Wendel.Jennifer@epamail.epa.gov
Cc: Reed, Angel
Subject: TTEMI-05-003-0051 Kerr McGee - Reference Issues
Attachments: Reference 11.pdf; Reference 04.pdf; Reference 25 Page D3.pdf; Reference 60.pdf; Reference 25 Plates 5 to 11.pdf

Hello all,

Below is information to resolve the reference issues identified in the May 7, 2009 email from Tanya Amme.

- Ref. 4: Says the document is 5 pages, but we received 2 pages.

  See attached revised Reference 4, which contains 3 pages.

- Reference 11, p.2: MISSING (copying error?)

  See attached revised Reference 11 with page 2 included.

- Reference 16: Delivered 165 pages, not 747 Pages

  Reference 16 contains 165 pages. The reference list will be updated in the next submission of the HRS documentation record.

- Reference 17: Delivered 929 pages, not 165 Pages.

  Reference 17 should be 747 pages. Please double check the page count received.

- Reference 25: Plate 5-11 MISSING & p. D3 Missing.

  See attached page D3 and Plates 5 through 11

- Reference 63: Delivered 42 pages, NOT 704 pages.

  The PDF document submitted on compact disc contains 704 pages. However, because most of those pages were not cited in the HRS documentation record, only 42 pages were submitted in hard copy.

- Reference 20: MISSING

  Reference 20 was deleted from the HRS documentation record during the internal review process. In order to prevent errors with renumbering the references throughout the document, Reference 20 was noted as "Reference Reserved" on the reference list. A new Reference 20 will be submitted when the HRS documentation package is resubmitted.

- Reference 60: MISSING

  Reference 60 is attached.

- Reference 40 (listed on the reference list) is not the document that was delivered to us.

  The correct Reference 40 was submitted which is:

  Tetra Tech. Project Note to File with Attachment. Subject: Soil Map of the Kerr McGee Chemical Corporation Property and Surrounding areas. April 8th, 2009. 4 pages.

Thanks and have a great day.

Sandra Harrigan| Project Manager

7/6/2009

Direct: 678.775.3088|Cell: 678.773.5428
Fax: 678.775.3138
sandra.harrigan@ttemi.com
Tetra Tech EM Inc.
1955 Evergreen Boulevard| Building 200, Suite 300
Duluth, GA 30096| www.tetratech.com

Reference No.: 04
Kerr-McGee Chemical Corporation
EPA ID No. FLD039049101

Project Note

Date:	May 13, 2009	**Project No.:**	TTEMI-05-003-0051
		Project Name:	Kerr-McGee
Name:	Sandra Harrigan		
Title:	Environmental Scientist		
Firm:	Tetra Tech EM Inc.		
Signature:	Sandra J Harrigan		
Subject:	Coordinates for Kerr McGee Chemical Corporation located at 1611 Talleyrand Avenue in Jacksonville, Duval County, Florida		

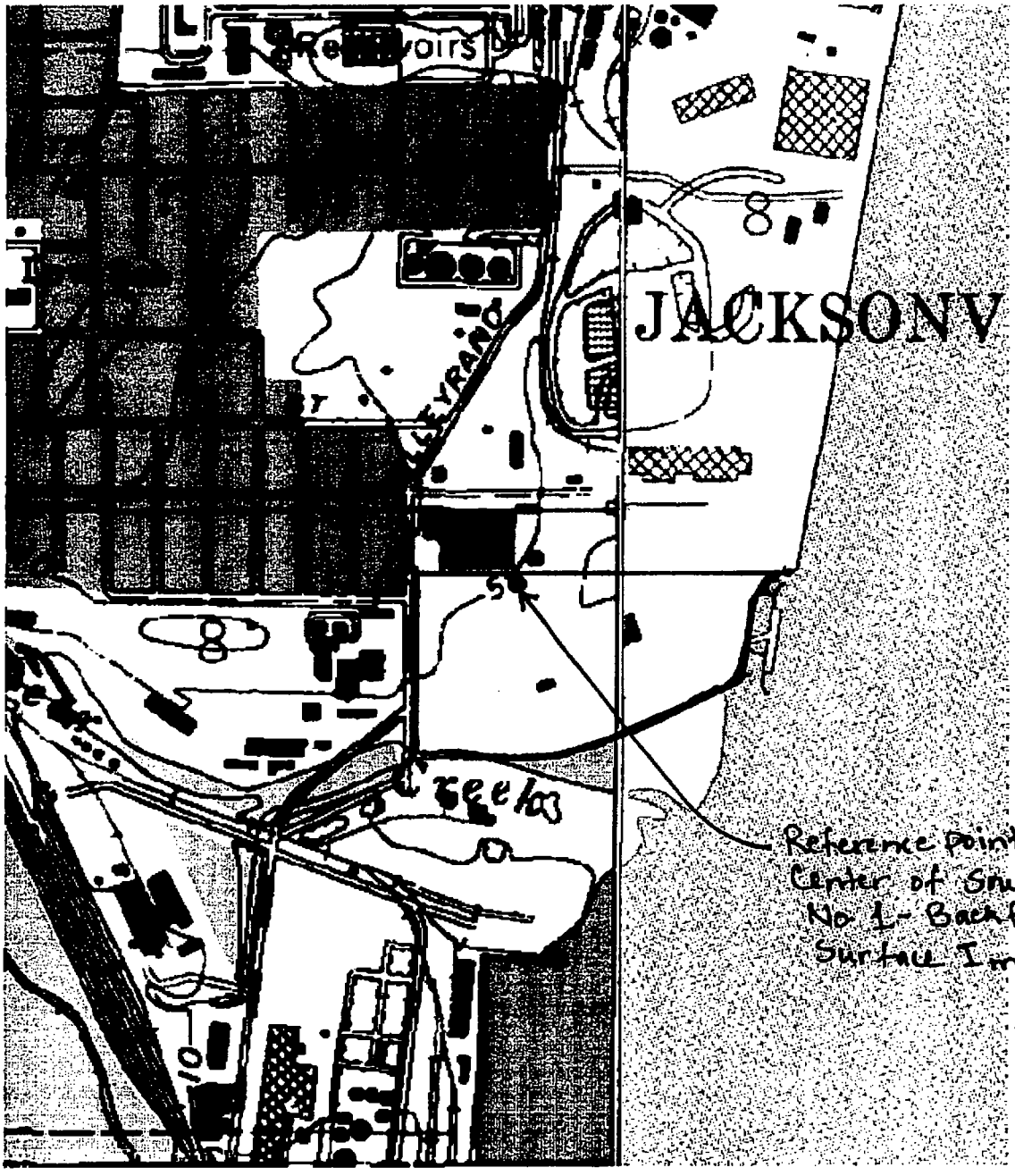
PROJECT NOTE SUMMARY

Attached is a printout from www.trails.com that shows the location of where the coordinates were measured for the Kerr McGee Chemical Corporation facility. The coordinates were measured from the approximate center of Source No. 1, the backfilled surface impoundment. Also attached is a map that shows the approximate location of the site reference point for the geographic coordinates. The approximate location of the surface impoundment was obtained from Figure 1-2 of the January 2006 Remedial Investigation (RI) Report prepared by Shaw Environmental, Inc., on behalf of Kerr McGee Chemical Corporation. Figure 1-2 of the Final RI is also attached.

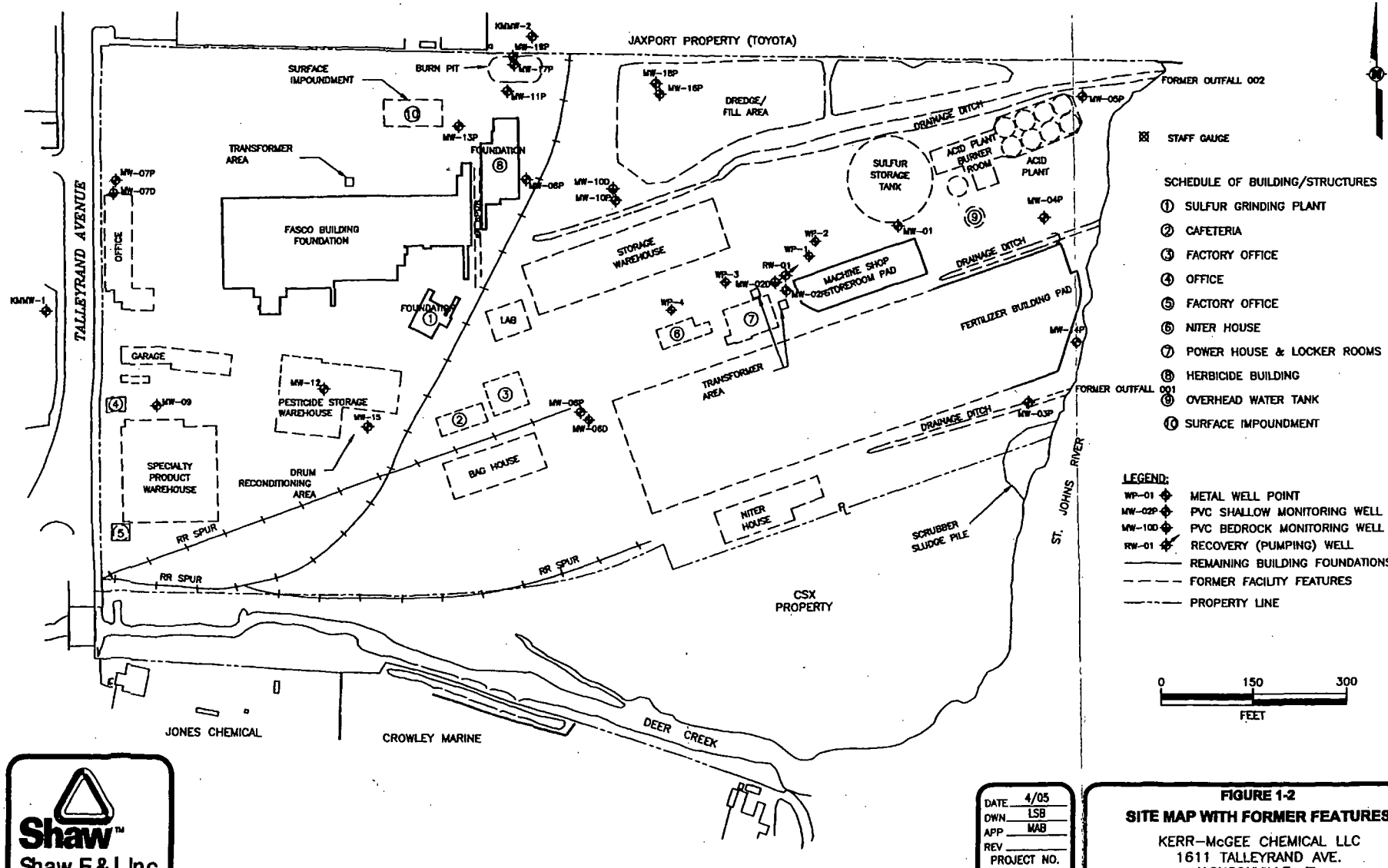
RESPONSE REQUIRED

(x) None ( ) Phone call ( ) Memo ( ) Letter ( ) Report

cc: File (x) Project Manager ( ) Principal Investigator ( ) Other (specify)


JACKSONV
Reference Point
Center of Source
No 1- Backfilled
Surface Impoundment
N
NW
NE
W
E
SW
SE
S
0 0.08 0.16 0.24 0.32 0.4 km
0 0.05 0.1 0.15 0.2 0.25 mi
30.3442°N 81.6265°W

2



Shaw™
Shaw E&I, Inc.

DATE	4/05
DWN	LSB
APP	MAB
REV	
PROJECT NO.	806578

FIGURE 1-2
SITE MAP WITH FORMER FEATURES
KERR-McGEE CHEMICAL LLC
1611 TALLEYRAND AVE.
JACKSONVILLE, FL

N:/CADD/CADD PROJECTS/CURRENT PROJECTS/KERR SCSR REV 1/FIG 20

Reference No.: 11
Kerr-McGee Chemical Corporation
EPA ID No. FLD039049101

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

IN THE MATTER OF:	)	
	)	**Proceeding under Sections 104,**
Kerr-McGee Chemical LLC Site	)	**122(a) and 122(d)(3) of the**
	)	**Comprehensive Environmental**
	)	**Response, Compensation**
	)	**and Liability Act of 1980,**
Kerr-McGee Chemical LLC	)	**as amended, 42 U.S.C.**
	)	**§§ 9604 and 9622.**
Respondent	)	
	)	**EPA Docket No.: 00-16-C**

ADMINISTRATIVE ORDER BY CONSENT
FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY

I. JURISDICTION

This Administrative Order by Consent (Consent Order) is entered into by the United States Environmental Protection Agency (EPA) with Kerr-McGee Chemical LLC, (Respondent), pursuant to the authority vested in the President of the United States by Sections 104, 122(a) and 122(d)(3) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §§ 9604, 9622(a) and 9622(d)(3). This authority was delegated by the President to the Administrator of the EPA (Jan. 29, 19 by Exec. Order No. 12580, dated January 23, 1987, 52 Fed. Reg. 2923 87), and was further delegated to the EPA Regional Administrator of Region IV, and redelegated to the Director, Waste Management Division, and still further delegated to the Chief of the South Site Management Branch.

Respondent agrees to undertake all actions required of it by the terms and conditions of this Consent Order for the conduct and implementation of the Remedial Investigation and Feasibility Study (RI/FS). The Respondent consents to and will not contest EPA jurisdiction regarding this Order.

II. PARTIES BOUND

This Consent Order shall apply to and be binding upon EPA and the Respondent, its agents, successors, assigns, officers, directors, and principals. Respondent is jointly and severally responsible for carrying out all actions required of it by this Consent Order. The signatories to this Consent Order certify that they are authorized to execute and legally bind the parties they represent to this Consent Order. No change in the ownership or corporate status of the Respondent shall alter its responsibilities under this Consent Order.

The Respondent shall provide a copy of this Consent Order to any subsequent owners or successors before ownership rights are transferred. The Respondent shall provide a copy of this Consent Order to all contractors, subcontractors, laboratories, and consultants which are retained to conduct any work performed under this Consent Order, within fourteen (14) days after the effective date of this Consent Order or the date of retaining their services, whichever is later. Respondent shall condition any such contracts upon satisfactory compliance with this Consent Order. Notwithstanding the terms of any contract, Respondent is responsible for compliance with this Consent Order and for ensuring that its subsidiaries, employees, contractors, consultants, subcontractors and agents comply with this Consent Order.

III. STATEMENT OF PURPOSE

In entering into this Consent Order, the mutual objectives of EPA and Respondent are: (A) with respect to the Remedial Investigation (RI), to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants at or from the Site into the environment; and (B) with respect to the Feasibility Study (FS), to develop and evaluate alternatives for remedial action to prevent, mitigate or otherwise respond to the migration or the release or threatened release of hazardous substances, pollutants, or contaminants from the Site; and (C) to recover response and oversight costs incurred by EPA with respect to this consent order.

EPA and the Respondent agree that by entering into and taking action under this Consent Order Respondent does not indicate its agreement with, or in any way admit or consent to the facts, conclusions or determinations contained herein, nor do any of its actions pursuant to this Consent Order constitute an admission of any liability by the Respondent. Respondent does not admit and retains the right to controvert in any subsequent judicial or administrative proceedings, other than proceedings initiated by the United States and EPA to implement or enforce this Consent Order, the validity of the Findings of Facts, Conclusions of Law, and Determinations contained in Sections IV, V, and VI, respectively, of this Consent Order.

The activities conducted pursuant to this Consent Order will be consistent with the National Contingency Plan (NCP), 40 C.F.R. Part 300, et seq., and will be subject to the express EPA approvals as set forth below.

IV. FINDINGS OF FACTS

The following constitutes an outline of the facts upon which this Consent Order is based:

A. The Kerr-McGee Chemical LLC Site is located at 1611 Tallyrand Avenue, Jacksonville, Duval County, Florida, within Township 2 South, Range 27 East, Section 8. The Site is located in a heavily industrialized area in the Port of Jacksonville. Residential and commercial properties are also located near the Site. Respondent's former manufacturing facility is contained in a 1500 foot by 1200 foot roughly rectangular grass-covered area located within an approximately 31 acre parcel of property. The Site is partially fenced and has gated entrances along Tallyrand Avenue.

From 1919 until 1970, the Site hosted pesticide and herbicide formulation operations and fertilizer and sulfuric acid manufacturing operations. Respondent purchased the Site in June 1970, and operated two manufacturing plants at the Site which facilitated the formulation, blending and packaging of pesticides, herbicides, and fertilizers until the Site was closed in early 1978. Former Site owner/operators included the Wilson and Toomer Company, Plymouth Cordage, and the Emhart Corporation.

The former pesticide and herbicide formulation and blending plant, also known as the Florida Agricultural Supply Company (FASCO) plant, was located on the northwest corner of the property, while the former fertilizer manufacturing plant was located on the eastern half of the property. Respondent also produced sulfuric acid in an on-Site plant and operated a steel drum reconditioning facility near the pesticide storage warehouse. Sulfuric acid production was discontinued in 1972, Superphosphate production was discontinued in 1976, and fertilizer blending operations ceased in 1978. All of the Site process buildings have been demolished and only the foundations from these buildings remaining visible today.

Respondent's Site production activities included: sulfur grinding; pesticide and solids blending; spraying of insecticides onto dry granule materials; insecticide and fertilizer mixing; pelletizing of herbicide dusts and powders; emulsifying of insecticides and fish oil soap; and the packaging and bottling of products. At the FASCO plant, pesticides were formulated in liquid, dust, granular, and pelletized form. No pesticide active ingredients were manufactured or purified on-Site and residual pesticide wastes were containerized and disposed of off-Site. The fertilizer portion of the facility manufactured superphosphate and blended agricultural nutrients to form standard and specialty grade fertilizers. Raw

materials for both pesticide and fertilizer operations and the final fertilizer products were stored in on-Site warehouses. Finished pesticide products were stored in drummed containers until shipped off-Site.

The potential major sources of contamination at the Site included the pesticide (FASCO building) and herbicide formulation and storage buildings, the bulk rail loading and unloading area, the former unlined surface impoundment area (12,800 cubic feet), located north of the FASCO building, the dredge/fill pond (231,500 cubic feet) located along the northern perimeter of the Site, which was used to dry dredged St. Johns River sediments removed from the dock area, and the scrubber sludge disposal pile (100,000 cubic feet), located near the former fertilizer plant. The surface impoundment, the dredge/fill pond, and the sludge pile have been closed and backfilled with debris consisting of soil, wood, concrete and other materials.

EPA contends that these areas became contaminated primarily from wastewaters and spills from the liquid pesticide/herbicide formulation processes and through product formulation residues in washdown waters. These materials were discharged to the unlined surface impoundment through an interior concrete drainage channel along the northside of the FASCO building. A sump pit in the channel then pumped the waste liquids to the surface impoundment. Moreover, the extent of Site contamination increased as clarified liquids from this impoundment were periodically pumped into the dredge/fill pond. Sludge from the Site's superphosphate scrubber was also disposed of on-Site.

B. The Respondent is Kerr-McGee Chemical LLC.

C. The Respondent is the Owner/Operator of the Site.

D. Currently, EPA is preparing a listing package for the proposal and inclusion of the Respondent's facility on the National Priority List, as defined in Section 105 of CERCLA, as amended, 42 U.S.C. § 9605.

E. During Site inspections and investigations conducted since 1984, the hazardous substances and/or pollutant or contaminants detected include, but may not limited to:

Media	Hazardous Substances, Pollutants and/or Contaminants, and Constituents of Potential Concern
Ground Water	Arsenic, Benzene, Beryllium, Cadmium, Chlorobenzene, 1,4 dichlorobenzene, 1,1 dichloroethene, Gamma BHC,Heptachlor, Alpha BHC, Beta BHC, Delta BHC, DDD, DDT, DDE, Dieldrin, Endosulfan, Aldrin, Toxaphene
Sediment - Onsite Drainage Ditch	Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Mercury, Vanadium, Zinc, DDT-P,P' Dieldrin, Endrin, Endrin Ketone, Hepatchlor, Toxaphene, PCB-1254, PCB-1260
Sediment - Deer Creek	PCB-1260
Sediment - St. Johns River	Arsenic, Barium, Beryllium, Cadmium Chromium, Lead, Manganese, Mercury, Nickel, Zinc, DDT Dieldrin, Endrin, Endrin Ketone, Heptachlor Toxaphene, PCB-1254, PCB-1260

F. The data concerning the Site contaminants was generated through numerous soil, ground water, and sediment/sludge sampling events which have occurred since 1984. These sampling events were conducted at the direction of the FDER/FDEP and overseen by the EPA and produced several Site investigation and remediation reports. This Site data indicates that the predominant constituents of concern involve pesticides, copper, manganese, and zinc. Groundwater contamination involving these compounds significantly exceed background levels and exceed federal and state primary drinking water standards. EPA believes that the contaminants identified in the St. Johns River sediment samples collected during the August 1998 ESI are consistent with and may be attributable to the contaminants discharged from surface water NPDES 001 and 002 outfalls and shallow groundwater from the Site.

G. The hazardous nature of contaminants present at the site include, but are not limited to:

Carcinogens

Arsenic	Beta-BHC	DDE	Lindane
Aldrin	Cadmium	DDT	PCB-1254
Alpha-BHC	Chromium	Dieldrin	PCB-1260
Benzene	DDD	Heptachlor	

Non-Carcinogens

Contaminant	Organ(s) Affected
Barium	Blood Pressure
Beryllium	Toxic - Intestines, Lungs
Chlorobenzene	Toxic - Kidney, Liver
1,4 Dichlorobenzene	Toxic - Kidney, Liver
Delta BHC	Toxic - Kidney, Liver
Endosulfan	Toxic - Kidney, Blood Vessels
Endrin	Toxic - Central Nervous Says., Liver
Lead	Toxic - Central Nervous Says, Kidney
Mercury	Toxic - Central Nervous Says.
Zinc	Toxic - Blood

H. The Site is located within the Eastern Valley Geomorphic Feature of the Geomorphologic Province of Florida. Three principal hydrogeologic units exist in the Site vicinity. These are the (1) surficial, (2) intermediate, and (3) Floridan aquifer systems. The surficial aquifer extends from land surface to 50-100 feet below land surface in Duval county. It includes undifferentiated Peitocene to Holcene Age sands, and clayey sands that locally contain shell beds. Limestone, where present, occurs at the base of the surficial aquifer system. There are three zones of the surficial aquifer based upon permeability; the water table zone, the low permeability zone, and an underlying limestone unit. The water table zone provides water for lawn irrigation and small scale domestic use. The low permeability zone functions as a semi-confining unit which inhibits vertical ground water flow from the overlying water table zone into the underlying limestone. The limestone unit is the principal water yielding zone of the surficial aquifer system. Ground water from the limestone unit is used primarily for domestic purposes, lawn irrigation, and in air conditioning and heating system heat exchange units. Ground water from the surficial aquifer is not used at the Site.

The intermediate aquifer provides limited artesian and non-artesian water supplies. A Hawthorn Group

primarily serves as an effective confining unit between the surficial aquifer system and the underlying Floridan aquifer system. The top of the Floridan aquifer reportedly occurs at a depth between 500-550 feet below National Geodetic Vertical Datum and ranges between 2,000 and 2,100 foot thickness. There is the presence of artesian conditions in the Floridan aquifer; This Floridan aquifer system is the principal source of potable ground water in the Jacksonville, FL area.

The Site is bordered to the east by the St. Johns River, the west by Talleyrand Avenue, the north by the Port of Jacksonville marine terminal, and to the south by CSX Corporation property that borders Deer Creek, which drains into the St. Johns River. The Site lies at an elevation between 5 and 10 feet above mean sea level. Surface water drainage in the Site vicinity is to the east and south, towards the St. Johns River and the Deer Creek. The majority of the Site is in a 500 year flood plain, while the southern and eastern portions are within a 100 year flood plain. Two NPDES outfalls to the St. Johns River are located at the eastern perimeter of the Site. The St. Johns River is a State Class III surface water and is a designated critical habitat for the West Indian Manatee.

I. EPA contends that the nature of the Site releases includes possible storage tank and process equipment leaks and spills from surface impoundments and ponds resulted in contaminated soils, contaminated river sediments, and contaminated ground water. Potential migration pathways include on-Site ditches, overland flow or run-off, ground water, and the existing outfalls which discharge directly into the St. Johns River. Known potential routes of exposure to hazardous substances include trespassers, shallow ground water discharge into the St. Johns River, direct contact with contaminated water and river sediments through recreation, and possible off-Site migration of shallow ground water onto the adjacent Site properties.

J. Human populations at potential risk include Site trespassers or visitors, persons ingesting fish caught in the St. Johns River or Deer Creek, and persons ingesting water taken from the surficial aquifer. Non-human receptors at potential risk include the following sensitive species: the shortnose sturgeon, the West Indian Manatee, the spotted turtle, and the southeastern weasel.

K. The potential consequences of the past and anticipated future releases from this Site include ingestion of contaminants through the consumption of fish and other aquatic life living in the St. Johns River, ingestion or incidental contact with contaminated soils while recreating on the St. Johns River, and the potential consumption of contaminated surface and/or groundwater on and adjacent to the Site.

L. The Kerr-McGee Chemical Corporation investigated the Site pesticide contamination under a July 1986 Consent Order with the Florida Department of Environmental Regulation (FDER). In addition, the Florida Department of Environmental Protection (FDEP) conducted an expanded Site inspection (ESI) at the eastern half of the Site which concluded in August 1998.

V. CONCLUSIONS OF LAW

A. The Site is a "facility" within the meaning of Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

B. The Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

C. The Respondent is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

D. The contaminants found at the Site, as described in Section IV above, are "hazardous substances" within the meaning of Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), or are constitute a "pollutant or contaminant" within the meaning of Section 101(33) of CERCLA, 42 U.S.C. § 9601(33), that may present an imminent and substantial danger to the public health or welfare under Section 104(a)(1) of CERCLA, 42 U.S.C. 9604(a)(1).

E. The hazardous substances or pollutant or contaminant described above have been "released" from the Site into the environment and their potential migration pathways constitute both an actual release and threatened release within the meaning of Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

VI. DETERMINATIONS

Based on the Findings of Fact and Conclusions of Law that EPA alleges above, EPA has determined that:

A. The actual and/or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health or welfare or the environment.

B. The actions required by this Consent Order are necessary to protect the public health and/or welfare and/or the environment.

C. In accordance with Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1), EPA has determined that the work to be performed pursuant to this Consent Order, if performed according to the terms of this Order, will be done properly and promptly by the Respondent. EPA has also determined that the Respondent is qualified to conduct such work.

VII. WORK TO BE PERFORMED

All aspects of the Work to be performed by Respondent pursuant to this Consent Order shall be under the direction and supervision of a qualified contractor who shall be a qualified professional engineer or geologist with expertise in hazardous site cleanup, the selection of which shall be subject to approval by EPA. Within fifteen (15) days after the effective date of this Consent Order, Respondent shall submit to EPA in writing the name, title, and qualifications of any supervising contractor proposed to be used in carrying out the RI/FS to be performed pursuant to this Consent Order. EPA shall notify the Respondent of its approval or disapproval in writing, within twenty (20) calendar days of its receipt of this submission by the Respondent.

If EPA disapproves of the selection of any contractor, Respondent shall submit a list of alternate contractors to EPA within fifteen (15) days of receipt of EPA's disapproval of the contractor previously selected. EPA shall, within twenty (20) calendar days of receipt of the list, provide written notice of the names of the contractors that it approves. The Respondent may at its election select any one from that list. Respondent shall notify EPA of the name of the contractor selected within fifteen (15) calendar days of EPA's notice of the approved contractors.

If, at any time thereafter, Respondent proposes to change any contractor, Respondent shall give written notice to EPA and shall obtain approval from EPA before the new contractor performs any work under this Consent Order.

Based on the foregoing, it is hereby AGREED TO AND ORDERED that the following work will be performed:

A. Within ninety (90) calendar days of the effective date of this Consent Order, Respondents shall submit to EPA a plan for a complete Remedial Investigation and Feasibility Study (RI/FS Work Plan). The RI/FS Work Plan shall be developed and submitted in conjunction with a Sampling and Analysis Plan and a Health and Safety Plan, although each plan may be delivered under separate cover. These plans shall be developed in accordance with the

National Contingency Plan and the attached Scope of Work (SOW) (Attachment 1) which is hereby made a part of this Consent Order as if fully set forth herein. The RI/FS Work Plan shall include a comprehensive description of the work to be performed, the media to be investigated (i.e., air, groundwater, surface water, surface and subsurface soils and sediments, etc.), the methodologies to be utilized, and the rationale for the selection of each methodology. A comprehensive schedule for completion of each major activity required by this Consent Order and including the submission of each deliverable listed in the RI/FS Scope of Work shall also be included. Such schedule shall reflect submittal of the Draft Feasibility Study within 400 calendar days of the effective date of this Consent Order.

The Sampling and Analysis Plan (SAP) shall include procedures to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data generated will meet the Data Quality Objectives (DQOs) established. The SAP provides a mechanism for planning field activities and consists of a Field Sampling and Analysis Plan (FSAP) and a Quality Assurance Project Plan (QAPP).

The FSAP shall define in detail the sampling and data-gathering methods that shall be used on the project. It shall include sample objectives, sample location (horizontal and vertical) and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that shall be used to achieve the desired DQOs.

A Health and Safety Plan shall be prepared in conformance with the Respondent's health and safety program and OSHA regulations and protocols.

B. EPA will prepare a community relations plan, in accordance with EPA guidance and the NCP. Respondent must also prepare a plan (hereinafter referred to as the Technical Assistance Plan) for providing funding for technical assistance to selected qualified representatives of the community to enable them to hire a technical advisor to help explain and comment on the response activities conducted pursuant to this Consent Order. Respondent will provide and administer up to $50,000 of its own funds to pay appropriate expenses incurred by the selected community representatives for the purpose of providing such technical assistance. Respondent's plan may also provide for utilizing existing forums to seek and obtain input from other community representatives on issues including, but not limited to, the environment, community redevelopment, stormwater drainage, and brownfields redevelopment.

C. The Respondent will perform the Baseline Risk Assessment, using a contractor approved by the EPA. The major components of the Baseline Risk Assessment include contaminant identification, exposure assessment, toxicity assessment, and human health and ecological risk characterization.

EPA will provide, after review of the Respondent's Site characterization summary, sufficient information concerning the risks such that Respondent can begin drafting the Feasibility Study (FS) Report.

The Respondent shall prepare a Baseline Risk Assessment Report based on the data collected by Respondent during the Site Characterization. EPA will release this Report to the public at the same time it releases the final RI Report. Both reports will be put into the administrative record for the Site.

EPA will respond to all significant comments on the Baseline Risk Assessment that are resubmitted during the formal comment period in the Responsiveness Summary of the Record of Decision.

D. Respondent will implement the RI/FS Work Plan approved by EPA. The EPA approved RI/FS Work Plan and any EPA approved amendments thereto will be attached to and incorporated in this Consent Order as Attachment 2. The RI/FS will be conducted in accordance with the schedule contained in the RI/FS Work Plan as approved by EPA.

E. Within fourteen (14) calendar days of the approval of the RI/FS Work Plan by EPA, Respondent will commence work on Task 1 of the RI/FS Work Plan.

F. Respondent shall submit to EPA written monthly progress reports which: (1) describe the actions which have been taken toward achieving compliance with this Consent Order during the previous month; (2) include all results of sampling and tests and all other data (as described in the attached Scope of Work: Task 1 - Scoping, page 8) received by Respondent during the course of the work; (3) include all plans and procedures completed under the Work Plan during the previous month; (4) describe all actions, data, and plans which are scheduled for the next month, and provide other information relating to the progress of the work as deemed necessary by EPA; and (5) include information regarding percentage of completion, unresolved delays, encountered or anticipated, that may affect the future schedule for implementation of the Scope of Work and/or RI/FS Work Plans, and a description of efforts made to mitigate those delays or anticipated delays. These progress reports are to be submitted to EPA by the fifth day of every month following the effective date of this Consent Order.

G. Deliverables, including reports, plans or other correspondence to be submitted pursuant to this Consent Order, shall be sent by regular certified mail, express mail or overnight delivery to the following addresses or to such other addresses as the EPA hereafter may designate in writing.

John Blanchard, P.E.
Remedial Project Manager
EPA - Region IV
Waste Management Division
61 Forsyth Street, SW
Atlanta, Georgia 30303

The number of copies to be submitted to EPA for each deliverable is identified in the RI/FS Scope of Work.

For informational purposes documents (two copies) shall be sent to:

Dr. Brian Cheary
7825 Baymeadows Way
Suite B-200
Jacksonville, FL 32256-7590

Documents to be submitted to the Respondent's Project Coordinator should be sent to:

Kerr-McGee Chemical LLC
Kerr-McGee Center
Oklahoma City, OK 73125
Attn: Mr. John Satterfield, PMP, REM

H. EPA may determine that other tasks are necessary to accomplish the objectives identified in the RI/FS Statement of Work, in addition to the EPA-approved tasks, deliverables, and reports which have been completed pursuant to this Consent Order. The Respondent shall implement any additional tasks which EPA determines are necessary as part of the RI/FS and which are in addition to the tasks detailed in the RI/FS Work Plan. Provided, however, that any additional task may only be required pursuant to this Paragraph to the extent that it is necessary to accomplish the objectives identified in the RI/FS Statement of Work. The additional work shall be completed in accordance with the standards, specifications, and schedule determined or approved by EPA.

In order to preserve its CERCLA Section 106(b)(2),42 U.S.C. § 9606(b)(2), rights concerning the costs associated with implementing any additional task identified pursuant to this paragraph, Respondent shall invoke the Dispute Resolution procedures in Section XIV for any additional task that it declines to implement, which EPA determines is necessary as part of the RI/FS. (See Section XIX). The SOW and/or related work

plans shall be modified in accordance with the final resolution of the dispute.

VIII. SUBMISSIONS REQUIRING AGENCY APPROVAL

A. EPA reserves the right to comment on, modify and direct changes for all deliverables. Upon receipt of any plan, report or other item which is required to be submitted for approval pursuant to this Consent Order, EPA shall either: (1) approve the submission; or (2) disapprove the submission, notifying Respondent of the deficiencies. If such submission is disapproved, EPA shall either: (1) notify the Respondent that EPA will modify the submission to cure the deficiencies; or (2) direct the Respondent to modify the submission to cure the deficiencies. EPA's review and approval or disapproval of such plans, reports or other items shall not act to unfairly delay or adversely impact Respondent's ability to comply with other particular deadlines related to the overall project schedule.

B. Upon receipt of a notice of disapproval and notification directing modification of the submission, Respondent shall, within thirty (30) days, cure the deficiencies and resubmit the plan, report, or other item for approval. Notwithstanding the notice of disapproval, Respondent shall proceed to take any action required by any nondeficient portion of the submission. Any stipulated penalties applicable to the submission, as provided in Section XVI, shall accrue during the 30 day period but shall not be payable unless the resubmission is disapproved pursuant to paragraph D. of the Section.

C. In the event of approval or modification of the submittal by EPA, Respondent shall proceed to take any action required by the plan, report, or other item, as approved or modified.

D. If, upon resubmission, the plan, report, or item is not a good faith and complete response to EPA's comments and therefore is not approved, Respondent shall be deemed to be in violation of this Consent Order and stipulated penalties shall begin to accrue pursuant to Section XVI of this Consent Order. EPA retains the right to seek stipulated or statutory penalties, to require the amendment of the document, to perform additional studies, to conduct a complete RI/FS pursuant to its authority under CERCLA, and to take any other action, including, but not limited to, enforcement action to recover its costs pursuant to its authority under CERCLA.

E. Neither failure of EPA to expressly approve or disapprove of Respondent's deliverables within a specified time period, nor the absence of comments, shall be construed as approval by EPA. Respondent is responsible for preparing and submitting deliverables acceptable to EPA.

F. Respondent shall make presentations at, and participate in, meetings at the request of EPA during the initiation, conduct and completion of the RI/FS. In addition to the discussion of the technical aspects of the RI/FS, topics will include anticipated problems or new issues. Meetings will be scheduled at EPA's discretion with reasonable notice to the Respondent.

G. The provisions of this Consent Order shall govern all proceedings regarding the RI/FS work conducted pursuant to this Consent Order. In the event of any inconsistency between this Consent Order and any required deliverable submitted by Respondent, the inconsistency will be resolved in favor of this Consent Order.

IX. DESIGNATED PROJECT COORDINATORS

A. On or before the effective date of this Consent Order, EPA and Respondent will each designate a Project Coordinator and an Alternate Project Coordinator. The "Project Coordinator" for EPA will be the Remedial Project Manager (RPM) or the On-Scene Coordinator (OSC) responsible for this Site. Each Project Coordinator will be responsible for overseeing the implementation of this Consent Order. The EPA Project Coordinator will be EPA's designated representative at the Site. To the maximum extent possible, communications between Respondent and EPA, including all documents, reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Consent Order, will be directed through the Project Coordinators.

B. EPA and Respondent each have the right to change their respective Project Coordinator. Such a change will be accomplished by notifying the other party in writing at least five (5) calendar days prior to the change.

C. The EPA designated Project Coordinator will have the authority vested in an RPM or OSC by the National Contingency Plan, 40 C.F.R. Part 300, as amended. This includes the authority to halt, conduct, or direct any work required by this Consent Order, or any response actions or portions thereof when he or she determines that conditions may present an immediate risk to public health or welfare or the environment.

D. The absence of the EPA Project Coordinator from the Site shall not be cause for the stoppage or delay of work.

E. EPA shall arrange for a qualified person to assist in its oversight and review of the conduct of the RI/FS, as required by Section 104(a) of CERCLA, 42 U.S.C. 9604(a). The oversight assistant may observe work and make inquiries in the absence of EPA, but is not authorized to modify the work plan.

X. QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS

A. Respondent shall use quality assurance, quality control, and chain of custody procedures in accordance with EPA's "Interim Guidelines and Specifications For Preparing Quality Assurance Project Plans" (QAMS-005/80) and the "EPA Region IV Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual (U.S. EPA Region IV, Environmental Services Division, February 1, 1991), and subsequent amendments to such guidelines. Prior to the commencement of any monitoring project under this Consent Order, Respondent shall submit for review, modification and/or approval by EPA, a Quality Assurance Project Plan ("QAPP") that is consistent with applicable guidelines. Sampling data generated consistent with the QAPP(s) shall be admissible as evidence, without objection, in any proceeding under Section XIV of this Consent Order. Respondent shall assure that EPA personnel or authorized representatives are allowed access to any laboratory utilized by Respondent in implementing this Consent Order.

B. Respondent shall make available to EPA the results of all sampling and/or tests or other data generated by Respondent with respect to the implementation of this Consent Order and shall submit these results in monthly progress reports as described in Section VII.E. of this Consent Order.

C. At the request of EPA, Respondent shall allow split or duplicate samples to be taken by EPA, and/or their authorized representative, of any samples collected by Respondent pursuant to the implementation of this Consent Order. Respondent shall notify EPA not less than fourteen (14) days in advance of any sample collection activity. In addition, EPA shall have the right to collect any additional samples that EPA deems necessary.

D. Respondent shall ensure that the laboratory utilized by Respondent for analyses participates in a EPA quality assurance/quality control program equivalent to that which is followed by EPA and which is consistent with EPA document QAMS-005/80. In addition, EPA may require submittal of data packages equivalent to those generated in the EPA Contract Laboratory Program (CLP) and may require laboratory analysis of performance samples (blank and/or spike samples) in sufficient number to determine the capabilities of the laboratory.

E. Notwithstanding any provision of this Consent Order, the EPA hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, RCRA, and any other applicable statute or regulation.

XI. ACCESS

A. From the date of execution of this Consent Order until EPA provides written notice of satisfaction of the terms of the Order, the EPA and its authorized representatives and agents shall have access at all times to the Site and any property to which access is required for the implementation of this Consent Order, to the extent access to the property is controlled by or available to Respondent, for the purposes of conducting any activity authorized by or related to this Consent Order, including, but not limited to:

1. Monitoring the RI/FS work or any other activities taking place on the property;

2. Verifying any data or information submitted to the United States;

3. Conducting investigations relating to contamination at or near the Site;

4. Obtaining samples;

5. Evaluating the need for or planning and implementing additional remedial or response actions at or near the Site; and

6. Inspecting and copying records, operating logs, contracts, or other documents required to assess Respondent's compliance with this Consent Order.

In an effort to respect Respondent's company-wide health and safety policy, EPA shall give reasonable notice (i.e. telephone or e-mail message) to Respondent of EPA's desire for access to the Site at times when Respondent or its contractors are not present.

B. To the extent that the Site or any other area where work is to be performed under this Consent Order is owned or controlled by persons other than Respondent, Respondent shall secure from such persons access for Respondent, as well as for EPA and authorized representatives or agents of EPA, as necessary to effectuate this Consent Order. Copies of such access agreements will be provided to EPA prior to Respondent's initiation of field activities. If access is not obtained within thirty (30) days of the effective date of this Consent Order, Respondent shall promptly notify the EPA. The United States may thereafter assist Respondent in obtaining access. Respondent shall, in accordance with Section XVII herein, reimburse the United States for all costs incurred by it in obtaining access, including but not limited to, attorneys' fees and the amount of

just compensation and costs incurred by the United States in obtaining access.

C. Notwithstanding any provision of this Consent Order, the EPA retains all of its access authorities and rights under CERCLA, RCRA and any other applicable statute or regulations.

XII. CONFIDENTIALITY OF SUBMISSIONS

A. Respondent may assert a confidentiality claim, if appropriate, covering part or all of the information requested by this Consent Order pursuant to 40 C.F.R. § 2.203(b). Such an assertion will be adequately substantiated when the assertion is made. Analytical data will not be claimed as confidential by Respondent. Information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to Respondent.

B. Respondent waives any objection to the admissibility into evidence (without waiving any objection as to weight) of the results of any analyses of sampling conducted by or for them at the Site or of other data gathered pursuant to this Consent Order that has been verified by the quality assurance/quality control procedures established pursuant to Section X.

XIII. RECORD PRESERVATION

EPA and Respondent agree that each will preserve, during the pendency of this Consent Order and for a minimum of six (6) years after its termination, all records and documents in their possession or in the possession of their divisions, employees, agents, accountants, contractors, or attorneys which relate in any way to the Site, despite any document retention policy to the contrary. After this six year period, Respondent will make a good faith effort to inform its records department to notify EPA within ninety (90) calendar days prior to the destruction of any such documents. Upon request by EPA, Respondent will make available to EPA such records or copies of any such records. Additionally, if EPA requests that documents be preserved for a longer period of time, Respondent will comply with that request.

XIV. DISPUTE RESOLUTION

Any disputes arising under this Consent Order shall be resolved as follows: If the Respondent objects to any EPA notice of disapproval or decision made pursuant to this Consent Order, the Respondent shall notify EPA's Project Coordinator in writing of its objections within 14 calendar days after receipt of the decision. Respondent's written objections shall define the dispute, state the basis of Respondent's objections, and be sent

certified mail, return receipt requested. EPA and the Respondent then have an additional fourteen (14) calendar days to reach agreement. If agreement cannot be reached within fourteen (14) calendar day period, the EPA Waste Management Division Director shall provide a written statement of the decision and the reasons supporting that decision to Respondent. The Division Director's determination is EPA's final decision. If Respondent does not agree to perform or does not actually perform the task in dispute as determined by EPA's Division Director, EPA reserves the right to conduct the work itself, to seek reimbursement from the Respondent, and/or to seek other appropriate relief.

Respondent is not relieved of its obligations to perform and conduct any work required by this Consent Order while a matter is pending in dispute resolution. Moreover, stipulated penalties with respect to the disputed matter shall continue to accrue, but payment shall be stayed pending the resolution of the dispute as provided in Section XVI.C.

If EPA seeks to enforce this Consent Order in court, Respondent may, subject to the provisions of Section 113(h) of CERCLA, 42 U.S.C. § 9613(h), seek judicial review, based on the administrative record, of EPA's final determination. In the event of such enforcement action, Respondent reserves its rights as set forth in this Consent Order, including the right to assert statutory defenses, if any, to violations of or imposition of stipulated penalties pursuant to this Consent Order.

XV. FORCE MAJEURE

A. "Force Majeure" is defined for the purposes of the Consent Order as an event arising from causes entirely beyond the control of Respondent and of any entity controlled by Respondent, including but not limited to, its contractors and subcontractors, which could not have been overcome by due diligence which delays or prevents the performance of any obligation under this Consent Order. Examples of events which may constitute force majeure events include extraordinary weather events, natural disasters, and national emergencies. Examples of events that are not force majeure events include, but are not limited to, normal inclement weather, increased costs or expenses of the Work to be performed under this Consent Order, the financial difficulty of Respondent to perform such tasks, the failure of Respondent to satisfy its obligation under this Consent Order, acts or omissions not otherwise force majeure attributable to Respondent's contractors or representatives, and the failure of Respondent or Respondent's contractors or representatives to make complete and timely application for any required approval or permit.

B. When circumstances occur which may delay or prevent the completion of any phase of the Work Plan or access to the Site or

to any property on which part of the Work Plan is to be performed, whether or not caused by a force majeure event, Respondent shall notify the EPA Project Coordinator orally of the circumstances within forty-eight (48) hours of when Respondent first knew or reasonably should have known that the event might cause delay. If the EPA Project Coordinator is unavailable, Respondent shall notify the designated alternate or the Director of the Waste Management Division, EPA Region IV. Within seven (7) calendar days after Respondent first became aware of such circumstances, Respondent shall supply to EPA in writing: (1) the reasons for the delay; (2) the anticipated duration of the delay; (3) all actions taken or to be taken to prevent or minimize the delay; (4) a schedule for implementation of any measures to be taken to mitigate the effect of the delay; and (5) a statement as to whether, in the opinion of the Respondent, such event may cause or contribute to an endangerment to public health, welfare, or the environment. Respondent shall exercise best efforts to avoid or minimize any delay and any effects of a delay. Failure to comply with the above requirements shall preclude Respondent from asserting any claim of force majeure.

C. If EPA agrees that a delay is or was caused by a force majeure event, the time for performance of the obligations under this Consent Order that are directly affected by the force majeure event shall be extended by agreement of the parties, pursuant to Section XXIII, for a period of time not to exceed the actual duration of the delay caused by the force majeure event. An extension of the time for performance of the obligation directly affected by the force majeure event shall not necessarily, but may, justify an extension of time for performance of any subsequent obligation.

D. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, or does not agree with Respondent on the length of the extension, the issue shall be subject to the dispute resolution procedures set forth in Section XIV of the Consent Order. In any such proceedings, to qualify for a force majeure defense, Respondent shall have the burden of proof that the delay or anticipated delay was or will be caused by a force majeure event, that the duration of the delay was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Respondent complied with the requirements of paragraph B of this Section. Should Respondent carry this burden, the delay at issue shall be deemed not to be a violation by Respondent of the affected obligation of the Consent Order.

XVI. STIPULATED PENALTIES

Unless excused under the provisions of Sections XIV or XV, the Respondent shall pay into the Hazardous Substance Superfund

administered by EPA, the sums set forth below as stipulated penalties.

Stipulated penalties shall accrue as follows:

A. For each day during which Respondent fails to perform, in accordance with the schedules contained in this Consent Order and in the various plans and reports required under this Consent Order incorporated by reference herein, any of the following activities:

1. for failure to timely submit the RI/FS Work Plan, Sampling and Analysis Plan, draft RI Report and draft FS Report required under this Consent Order;

2. for failure to timely submit any modifications requested by EPA or its representatives to the RI/FS Work Plan,

Sampling and Analysis Plan, draft RI Report and draft FS Report as required under this Consent Order; and

3. for failure to timely submit payment of oversight costs as provided in Section XVII.

Respondent shall be liable to EPA for stipulated penalties in the following amounts:

Period of Failure to Comply	Penalty Per Violation Per Day
1st through 14th day	$1,000
15th through 44th day	$2,500
45th day and beyond	$5,000

B. If Respondent fails to submit a monthly progress report by its due date, Respondent shall be liable to EPA for stipulated penalties in the amount of $500 per violation for each day during which Respondent fails to submit and, if necessary, modify monthly reports.

C. Respondent shall be liable to EPA for stipulated penalties in the amount of $500 per violation for each day during which Respondent fails to comply with all other requirements of this Consent Order including, but not limited to, any implementation schedule, payment requirement, notification requirement or completion deadline.

All stipulated penalties begin to accrue on the day the violation occurs or on the day following Respondent's failure to comply with any schedule or deadline or the terms, conditions, or requirements contained in this Consent Order and/or Work Plan. Stipulated penalties shall continue to accrue until Respondent's

violation ends or until Respondent complies with the particular schedule or deadline.

Payment of stipulated penalties shall be due and owing within fifteen (15) days from the receipt of a written notice from EPA notifying Respondent that stipulated penalties have been assessed, unless Respondent invokes the Dispute Resolution procedures under Section XIV of this Consent Order for such stipulated penalties. Interest shall accrue on any unpaid amounts, beginning at the end of the fifteen day period, at the rate established by the Department of Treasury under 31 U.S.C. § 3717. Respondent shall pay a six percent per annum penalty charge, to be assessed if the stipulated penalty is not paid in full within 90 days after it is due. The check and transmitted letter shall identify the Name of the Site, the Site identification number and the title of this Order. A copy of the transmittal letter should be sent simultaneously to the EPA Project Coordinator.

Payment shall be made to:

U. S. Environmental Protection Agency
Region IV
Superfund Accounting
P. O. Box 100142
Atlanta, Georgia 30303
ATTENTION: (Collection Officer for Superfund)

Respondent may dispute EPA's right to the stated amount of stipulated penalties by invoking the Dispute Resolution procedures under Section XIV of this Order. Stipulated penalties shall accrue but need not be paid during the dispute resolution period. If Respondent does not prevail upon resolution, all stipulated penalties shall be due to EPA within 30 days of resolution of the dispute. If Respondent prevails upon resolution, no stipulated penalties shall be paid.

In the event that EPA provides for corrections to be reflected in the next deliverable and does not require resubmission of that deliverable, stipulated penalties for that interim deliverable shall cease to accrue on the date of such decision by EPA.

Nothing herein shall prevent the simultaneous accrual of separate stipulated penalties for separate violations of this Consent Order.

The stipulated penalties set forth in this Section do not preclude EPA from electing to pursue any other remedies or sanctions which may be available to EPA by reason of the Respondent's failure to comply with any of the requirements of this Consent Order. Such remedies and sanctions may include a

federally-funded response action and a suit for reimbursement of costs incurred by the United States.

Notwithstanding any other provision of this Section, the EPA may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Consent Order.

XVII. REIMBURSEMENT OF OVERSIGHT AND RESPONSE COSTS

In accordance with Section 104(a)(1) of CERCLA, as amended, 42 U.S.C. § 9604(a)(1), Respondent agrees to reimburse the Hazardous Substance Superfund for all response and oversight costs incurred by EPA or its authorized representatives in oversight of Respondent's performance of work under the Consent Order.

At the end of each fiscal year, EPA will submit to Respondent an accounting of all response and oversight costs incurred by the U.S. Government with respect to this Consent Order. Oversight costs shall include all direct and indirect costs of EPA's oversight arrangement for the RI/FS, including, but not limited to, time and travel costs of EPA personnel and associated indirect costs, contractor costs, compliance monitoring, including the collection and analysis of split samples, inspection of RI/FS activities, site visits, interpretation of Consent Order provisions, discussions regarding disputes that may arise as a result of this Consent Order, review and approval or disapproval of reports, the costs of redoing any of Respondent's tasks, and any assessed interest.

EPA's Agency Financial Management System summary data (SCORES Reports) shall serve as the basis for payment demands.

Failure to submit an accounting in one fiscal year does not prevent EPA from submitting an accounting for that year in a subsequent fiscal year. Respondent shall, within thirty (30) calendar days of receipt of each accounting, remit a certified or cashiers check for the amount of those costs made payable to the EPA Hazardous Substance Superfund. Payment may also be made by FedWire Electronic Funds Transfer ("EFT" or wire transfer) in accordance with current electronic funds transfer procedures that will be provided to Respondent. Such EFT payment shall reference the EPA Region and Site/Spill ID #A4K1. Any payments received by EPA after 4:00 P.M. (Eastern Time) will be credited on the next business day. If not paid within the thirty (30) day period, interest shall begin to accrue on any unpaid balance from the date of receipt of each annual accounting. Checks should specifically reference the identity of the Site and should be sent to:

U. S. Environmental Protection Agency
Region IV
Superfund Accounting
P. O. Box 100142
Atlanta, Georgia 30303
ATTENTION: Collection Officer for Superfund

A copy of the transmittal letter should be sent simultaneously to the EPA Project Coordinator.

Respondent agrees to limit any disputes concerning costs to accounting errors and the inclusion of costs outside the scope of this Consent Order. Respondent shall identify any contested costs and the basis of its objection. All undisputed costs shall be remitted by Respondent in accordance with the schedule set out above. Disputed costs shall be paid by Respondent into an escrow account while the dispute is pending. Respondent bears the burden of establishing an EPA accounting error and the inclusion of costs outside the scope of this Consent Order.

EPA reserves the right to bring an action against the Respondent pursuant to Section 107 of CERCLA to enforce the response and oversight cost reimbursement requirements of this Consent Order and to collect stipulated penalties assessed pursuant to section XVI of this Consent Order.

XVIII. RESERVATION OF RIGHTS

Notwithstanding compliance with the terms of this Consent Order, the Respondent is not released from liability, if any, for any actions beyond the terms of this Consent Order taken by EPA regarding this Site. EPA reserves the right to take any enforcement action pursuant to CERCLA or any other available legal authority, including the right to seek injunctive relief, monetary penalties, and punitive damages for any violation of law or this Consent Order.

Except as otherwise provided herein, EPA and Respondent expressly reserve all rights and defenses that they may have, including EPA's right both to disapprove of work performed by Respondent and to require that Respondent perform tasks in addition to those detailed in the RI/FS Work Plan, as provided in this Consent Order, and including, in the event of judicial review of disputes under this Consent Order, the positions each party may assert with respect to the merits of the underlying violation and the standard of review to be applied. In the event that Respondent declines to perform any additional or modified tasks, EPA will have the right to undertake any RI/FS work. In addition, EPA reserves the right to undertake removal actions and/or remedial actions at any time. In either event, EPA reserves the right to seek reimbursement from Respondent thereafter for such costs

which are incurred by the United States and Respondent reserves all rights to contest or defend against such claims or actions.

The parties to this Consent Order reserve any claims they now have or ever will have against any third party including, but not limited to, those claims under Sections 107 and 113 of CERCLA, for recovery of all past and future response costs incurred in connection with response activities conducted pursuant to CERCLA at the Site, including oversight costs arising out of or related to this Consent Order.

This Consent Order only addresses, and is expressly limited to the funding, finalization, and implementation of the RI/FS Work Plan, and does not address in any way the implementation of remedial or removal actions at the Site. Respondent's agreement to fund, finalize, and implement the RI/FS Work Plan does not create an inference or presumption regarding Respondent's role in or responsibility, if any, for such remedial or removal actions or for contamination at the Site.

The Settling Defendants reserve, and this Consent Order is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States while acting within the scope of his office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, any such claim shall not include a claim for any damages caused, in whole or in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of the Settling Defendants' plans or activities. The foregoing applies only to claims which are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

Following satisfaction of the requirements of this Consent Order, Respondent shall have resolved its liability to EPA for the performance of the RI/FS that is the subject of this Order. The Respondent is not released from liability, if any, for any actions taken beyond the terms of this Order regarding removals, other operable units, remedial design/remedial action (RD/RA), or activities arising pursuant to section 121(c) of CERCLA.

XIX. OTHER CLAIMS

Nothing in this Consent Order constitutes a release from any claim, cause of action or demand in law or equity against any

person, firm, partnership, or corporation for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken from the Site, except as to matters granted such release pursuant to judicial review in accordance with Section XIV of this Consent Order.

EPA reserves the right to bring an action against the Respondent pursuant to Section 107 of CERCLA for recovery of all response and oversight costs incurred by the United States related to this Consent Order and not reimbursed by Respondent, as well as any other past and future costs incurred by the United States in connection with response activities conducted pursuant to CERCLA at this Site.

This Consent Order does not constitute a preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

In entering into this Consent Order, Respondent waives any right to seek reimbursement under Section 106(b)(2) of CERCLA, 42 U.S.C. § 9606(b)(2), for any past costs associated with this Site, or any costs incurred in complying with this Consent Order. Moreover, Respondent waives any right to seek reimbursement under Section 106(b)(2) of CERCLA, 42 U.S.C. § 9606(b)(2), for any costs associated with implementing any additional task(s) identified pursuant to Section VII. H. of the Consent Order, if Respondent declines to invoke the Dispute Resolution procedures in Section XIV of this Consent Order concerning the costs related to such additional task(s). Respondent shall bear its own costs and attorney fees.

XX. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to this Consent Order will be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations unless an exemption from such requirements is specifically provided in this Consent Order, or made a part of this Consent Order by being incorporated herein at some later date.

XXI. INDEMNIFICATION OF THE UNITED STATES GOVERNMENT

Respondent agrees to indemnify and save and hold harmless the United States, its agencies, departments, officials, agents, employees, contractors, or representative, from any and all claims or causes of action arising from or on account of acts or omissions of Respondent, its officers, employees, receivers, trustees, agents, or assigns, in carrying out the activities pursuant to this Consent Order. The United States Government or any agency or authorized representative thereof shall not be held

to be a party to any contract involving Respondent at or relating to the Site.

XXII. PUBLIC COMMENT

Upon submittal to EPA of the Feasibility Study Final Report, EPA will make both the Remedial Investigation Final Report and the Feasibility Study Final Report and EPA's Proposed Plan available to the public for review and comment for, at a minimum, a thirty (30) day period, pursuant to EPA's Community Relations Plan and the NCP. Following the public review and comment period, EPA will notify Respondent of the remedial action alternative selected for the Site.

XXIII. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

In consideration of the communications between Respondent and EPA prior to the issuance of this Consent Order concerning its terms, Respondent agrees that there is no need for an additional settlement conference prior to the effective date of this Consent Order. Therefore, the effective date of this Consent Order will be the date on which it is signed by EPA. This Consent Order may be amended by mutual agreement of EPA and Respondent. Such amendments will be in writing and will have, as the effective date, that date on which such amendments are signed by EPA. EPA Project Coordinators do not have the authority to sign amendments to the Consent Order.

Any reports, plans, specifications, schedules, and attachments required by this Consent Order are, upon approval by EPA, incorporated into this Consent Order. Any noncompliance with such EPA approved reports, plans, specifications, schedules, and attachments will be considered a failure to achieve the requirements of this Consent Order and will subject the Respondent to the provisions included in the "Force Majeure" and "Stipulated Penalties" sections (Sections XV and XVI) of this Consent Order.

No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by Respondent will be construed as relieving Respondent of its obligation to obtain such formal approval of EPA as may be required by this Consent Order.

XXIV. NOTICE TO THE STATE

EPA has notified the State of Florida regarding the requirements of this Consent Order.

Upon completion of the RI/FS, pursuant to the requirements of Section 104(c)(2) of CERCLA, 42 U.S.C. § 9604(c)(2), EPA will

notify the State of Florida before determining the appropriate remedial action to be taken at the Site.

XXV. TERMINATION AND SATISFACTION

This Consent Order shall terminate when the Respondent demonstrates in writing and certifies to the satisfaction of EPA that all activities required under this Consent Order, including any additional work, payment of past costs, response and oversight costs, and any stipulated penalties that Respondent is obligated to pay under the terms of this Consent Order, have been performed and EPA has approved the certification. This notice shall not, however, terminate Respondent's obligation to comply with Sections XIII, XVII, and XVIII of this Consent Order.

The certification shall be signed by a responsible official representing the Respondent. The representative shall make the following attestation: "I certify that the information contained in or accompanying this certification is true, accurate, and complete." For purposes of this Consent Order, a responsible official is a corporate official who is in charge of a principal business function. Upon receipt of the certification from the Respondent that is satisfactory to EPA, EPA will acknowledge, in writing, its acceptance thereof.

IN THE MATTER OF:
Kerr-McGee Chemical LLC Site
Jacksonville, Florida
EPA Docket No.:

IT IS SO AGREED AND ORDERED:

BY: _____ 3/7/00
Kerr-McGee Chemical LLC Date

BY: _____ 3/30/00
Curt Fehn Date
Chief, South Site Branch
Waste Management Division
Region IV
U.S. Environmental Protection Agency

SCOPE OF WORK FOR THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THE KERR-MCGEE CHEMICAL LLC SITE

INTRODUCTION

The purpose of this Remedial Investigation/Feasibility Study (RI/FS) is to investigate the nature and extent of contamination at the Kerr-McGee Chemical LLC Site (the "Site"), assess the current and potential risk to public health, welfare, and the environment, and to develop and evaluate potential Remedial Action Alternatives. The RI and FS are interactive and shall be conducted concurrently so that the data collected in the RI influences the development of Remedial Action Alternatives in the FS, which in turn affects the data needs and the scope of Treatability Studies.

The Respondent shall conduct the RI/FS (including the Baseline Risk Assessment component) and produce an RI/FS Report that is in accordance with this Scope of Work, the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, (Interim Final) (U.S. EPA Office of Emergency and Remedial Response, October 1988) (the "RI/FS Guidance"), the National Oil and Hazardous Substances Pollution Contingency Plan (March 8, 1990) and other guidances used by EPA in conducting an RI/FS (the primary guidances are listed in Attachment A), as well as any additional requirements in the Administrative Order. The RI/FS Guidance describes the report format and the required report content. Pertinent RI/FS Guidance section numbers are denoted in parenthesis throughout this Scope of Work. The Respondent shall furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the Administrative Order.

At the completion of the RI/FS, EPA shall be responsible for the selection of a remedy to be implemented for the Site. EPA will document this selection of a remedy in a Record of Decision (ROD). The Remedial Action Alternative selected by EPA will meet the cleanup standards specified in §121 of SARA. That is, the selected remedial action will be protective of human health and the environment, will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements of other laws or regulations, and will address the statutory preference for on-site treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants as a principal element. The Final Remedial Investigation and Feasibility Study Report(s), as adopted by EPA, and the Baseline Risk Assessment will, with the remainder of the Administrative Record, form the basis for the

selection of the remedy to be implemented for the Site and will provide the information necessary to support the development of the ROD.

As specified in §104(a)(1) of CERCLA, as amended by SARA, EPA must provide oversight of the Respondent activities throughout the RI/FS. The Respondent shall support EPA's initiation and conduct of activities related to the implementation of oversight activities. However, the primary responsibility for conducting an adequate RI/FS to enable and support the selection of a remedy shall lie with the Respondent. EPA review and approval of deliverables is a tool to assist this process and to satisfy, in part, EPA's responsibility to provide effective protection of public health, welfare, and the environment. EPA approval of a task or deliverable shall not be a guarantee as to the ultimate adequacy of such task or deliverable. A summary of the major deliverables that Respondent shall submit for the RI/FS is attached (Attachment B). In addition, a general schedule of RI/FS activities is also attached (Attachment C).

TASK 1 - SCOPING

Scoping is the initial planning process of the RI/FS and has been initiated by EPA to determine the site-specific objectives of the RI/FS prior to negotiations between the Respondent and EPA. Scoping is continued, repeated as necessary, and refined throughout the RI/FS process. In addition to developing the Site Objectives of the RI/FS, EPA has developed a Site Management Strategy. Consistent with the Site Management Strategy, the specific project scope shall be planned by the Respondent and EPA. The Respondent shall document the specific project scope in a Work Plan. Because the work required to perform an RI/FS is not fully known at the onset, and is phased in accordance with a Site's complexity and the amount of available information, it may be necessary to modify the Work Plan during the RI/FS to satisfy the objectives of the study.

The Site Objectives for the Kerr-McGee Chemical LLC Site have been determined preliminarily, based on available information, to be the following:

1. Review of existing information pertaining to the Site. This review includes Site Inspection Reports, reports from local, State and Federal agencies, court records, information from local businesses such as local well drillers and waste haulers and generators, facility records, and information from facility owners and employees and nearby citizens.

2. Review of relevant guidance (see attached references) to understand the remedial process. This information shall be used in performing the RI/FS and preparing all deliverables under this SOW.

3. Identification of all Federal and State applicable or relevant and appropriate requirements (ARARs).

4. Determination of the nature and lateral and vertical extent of contamination (waste types, concentrations and distributions) for all affected media including air, ground water, soil, surface water, and sediment, etc.

5. Performance of a well survey within a three mile radius of the Site including determining water uses, well construction methods used, the number and age of users, and the volume and rate of water usage.

6. Identification and screening of potential treatment technologies along with containment/disposal requirements for residuals or untreated wastes.

7. Assembly of technologies into Remedial Action Alternatives and screening of alternatives.

8. Performance of bench or pilot Treatability Studies as necessary.

9. Detailed analysis of Remedial Action Alternatives

The Site Management Strategy for the Kerr-McGee Chemical LLC Site includes the following:

1. A complete investigation of the Site including any and all off-site contamination which may have been caused by contaminants originating from the Site.

2. Use of the RI to identify any other Potentially Responsible Parties that may be involved.

3. Evaluation of the Site as a whole, i.e., it is not anticipated at this time that the Site will be partitioned into separate operable units. It is anticipated that only one Record of Decision (ROD) will be prepared for the Site.

4. An expectation that no interim remedial measures are required.

5. EPA oversight of the Respondent conduct of the work (i.e., the RI/FS and any response action) to ensure compliance with applicable laws, regulations and guidances and to ensure that the work proceeds in a timely fashion.

6. Respondent preparation of the Baseline Risk Assessment.

7. EPA management of the Remedy Selection and Record of Decision phase with input from State Agencies, Natural Resource Trustees and the Public (including the Respondent). When scoping the specific aspects of a project, the Respondent must meet with EPA to discuss all project planning decisions and special concerns associated with the Site. The following activities shall be performed by the Respondent as a function of the project planning process.

a. Site Background

The Respondent shall gather and analyze the existing background information regarding the Site and shall conduct a visit to the Site to assist in planning the scope of the RI/FS.

Collect and Analyze Existing Data and Document the Need for Additional Data

Before planning RI/FS activities, all existing Site data shall be thoroughly compiled and reviewed by the Respondent. Specifically, this compilation and review shall include currently available data relating to the varieties and quantities of hazardous substances at the Site and past disposal practices (what type of contaminants were dumped where, when, and by whom). This compilation and review shall also include results from any previous sampling or other investigations that may have been conducted. The Respondent shall refer to Table 2-1 of the RI/FS Guidance for a comprehensive list of data collection information sources. This information shall be utilized in determining additional data needed for Site Characterization, better defining potential applicable or relevant and appropriate requirements (ARARs), and developing a range of preliminarily identified Remedial Action Alternatives. Subject to EPA approval, Data Quality Objectives (DQOs) shall be established that specify the usefulness of existing data. Decisions on the necessary data and DQOs shall be made by EPA.

Conduct Site Visit

The Respondent shall conduct a visit to the Site with the EPA Remedial Project Manager (RPM) during the project scoping phase to assist in developing a conceptual understanding of sources and areas of contamination as well as potential exposure pathways and receptors at the Site. During the visit to the Site the Respondent shall observe the physiography, hydrology, geology, and demographics of the Site as well as related natural resource, ecological and cultural features. This information shall be utilized to better scope the project and to determine the extent of additional data necessary to characterize the Site, better define potential ARARs, and narrow the range of preliminarily identified Remedial Action Alternatives.

b. Project Planning

Once the Respondent have collected and analyzed existing data and conducted a visit to the Site, the specific project scope shall be planned. Project planning activities include those tasks described below as well as the development of specific required deliverables as described in paragraph c. The Respondent shall meet with EPA regarding the following activities and before the drafting of the scoping deliverables.

Refine the Site Objectives and Develop Preliminary Remedial Action Objectives and Alternatives

Once existing information about the Site has been analyzed and a conceptual understanding of the potential risks posed by the Site has been obtained, the Respondent shall review and, if necessary, refine the Site Objectives and develop preliminary remedial action objectives for each actually or potentially contaminated medium. Any revised Site Objectives shall be documented in a technical memorandum and are subject to EPA approval prior to development of the other scoping deliverables. The Respondent shall then identify a preliminary range of broadly defined potential Remedial Action Alternatives and associated technologies. The range of potential alternatives shall include, at a minimum, alternatives in which treatment is used to reduce the toxicity, mobility, or volume of the waste, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; alternatives that involve containment and treatment components; alternatives that involve containment with little or no treatment; and a no-action alternative.

Document the Need for Treatability Studies

If remedial actions involving treatment have been identified by the Respondent or EPA, Treatability Studies shall be required except where the Respondent can demonstrate to EPA's satisfaction that they are not needed. Where Treatability Studies are needed, identification of possible technologies and screening shall be done and the results submitted with the RI/FS Work Plan. Initial Treatability Study activities (such as research and study design) shall be planned to occur concurrently with Site Characterization activities (see Tasks 3 and 4).

Begin Preliminary Identification of Potential ARARs

The Respondent shall conduct a preliminary identification of potential State and Federal ARARs (chemical-specific, location-specific, and action-specific) to assist in the refinement of remedial action objectives and the initial identification of Remedial Action Alternatives and ARARs associated with particular actions. ARAR identification shall continue as conditions and contaminants at the Site and Remedial Action Alternatives are better defined.

c. Scoping Deliverables

At the conclusion of the project planning phase, the Respondent shall submit an RI/FS Work Plan, a Sampling and Analysis Plan, and a Health and Safety Plan. The RI/FS Work Plan and Sampling and Analysis Plan must be reviewed and approved and the Health

and Safety Plan reviewed by EPA prior to the initiation of field activities.

RI/FS Work Plan

A Work Plan documenting the decisions and evaluations completed during the scoping process shall be submitted to EPA for review and approval. The Work Plan shall be developed in conjunction with the Sampling and Analysis Plan and the Health and Safety Plan, although each plan may be delivered under separate cover. The Work Plan shall include a comprehensive description of the work to be performed, the medias to be investigated (i.e., Air, Ground Water, Surface Water, Surface and Subsurface Soils, and Sediments, etc.), the methodologies to be utilized, and the rationale for the selection of each methodology. A comprehensive schedule for completion of each major activity and submission of each deliverable shall also be included. This schedule shall be consistent with Attachment C.

Specifically, the Work Plan shall present the following:

- A statement of the problem(s) and potential problem(s) posed by the Site and the objectives of the RI/FS.

- A background summary setting forth the following:

- a description of the Site including the geographic location, and, to the extent possible, a description of the physiography, hydrology, geology, demographics, and the ecological, cultural, and natural resource features of the Site;

- a synopsis of the history of the Site including a summary of past disposal practices and a description of previous responses that have been conducted by local, State, Federal, or private parties at the Site;

- a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified and their distribution among the environmental media at the Site.

- A description of the Site Management Strategy developed by EPA during scoping as discussed previously in this SOW and as may be modified with EPA's approval;

- A preliminary identification of Remedial Action Alternatives and data needs for evaluation of Remedial Action Alternatives. This preliminary identification shall reflect coordination with Treatability Study requirements (see Tasks 1 and 4).

- A process for identifying Federal and State ARARs (chemical-specific, location-specific, and action-specific).

- A statement recognizing EPA's preparation of the Baseline Risk Assessment.

- A detailed description of the tasks to be performed, information needed for each task and for EPA's Baseline Risk Assessment, information to be produced during and at the conclusion of each task, and a description of the work products that shall be submitted to EPA. This description must also include the deliverables set forth in the remainder of this Scope of Work.

- A schedule for each of the required activities which is consistent with Attachment C and the RI/FS Guidance.

- A project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format, and backup data management), monthly reports to EPA, and meetings and presentations to EPA at the conclusion of each major phase of the RI/FS.

The Respondent shall refer to Appendix B of the RI/FS Guidance for a comprehensive description of the contents of the required Work Plan.

Because of the unknown nature of the Site and iterative nature of the RI/FS, additional data requirements may be identified throughout the RI/FS process. The Respondent shall submit a technical memorandum documenting any need for additional data along with the proposed DQOs whenever such requirements are identified. In any event, the Respondent are responsible for fulfilling additional data and analysis needs identified by EPA consistent with the general scope and objectives of this RI/FS and the Administrative Order.

Sampling and Analysis Plan

The Respondent shall prepare a Sampling and Analysis Plan (SAP) to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data generated will meet the DQOs established. The SAP provides a mechanism for planning field activities and consists of a Field Sampling and Analysis Plan (FSAP) and a Quality Assurance Project Plan (QAPP).

The FSAP shall define in detail the sampling and data-gathering methods that shall be used on the project. It shall include sampling objectives, sample location (horizontal and vertical) and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that shall be used to achieve the desired DQOs. The DQOs will, at a minimum, reflect use of

analytical methods for identifying contamination and addressing contamination consistent with the levels for remedial action objectives identified in the proposed National Contingency Plan, pages 51425-26 and 51433 (December 21, 1988). In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, and data reduction, validation, and reporting. These procedures must be consistent with the Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual May 1996. Field personnel shall be available for EPA QA/QC training and orientation, as required.

The Respondent shall demonstrate, in advance and to EPA's satisfaction, that each laboratory it may use is qualified to conduct the proposed work. This demonstration must include use of methods and analytical protocols for the chemicals of concern (typically the Target Compound List (TCL) and the Target Analyte List (TAL)) in the media of interest within detection and quantification limits consistent with both QA/QC procedures and DQOs approved by EPA in the QAPP for the Site. The laboratory must have and follow an EPA-approved QA program. The Respondent shall provide assurances that EPA has access to laboratory personnel, equipment and records for sample collection, transportation, and analysis. EPA may require that the Respondent submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment, and material specifications. In addition, EPA may require submittal of data packages equivalent to those generated in the EPA Contract Laboratory Program (CLP) and may require laboratory analysis of performance samples (blank and/or spike samples) in sufficient number to determine the capabilities of the laboratory. (See the October 29, 1999 e-mail from John Blanchard of EPA to John Satterfield of Kerr McGee entitled "Submission of Sampling Data to EPA"). If a laboratory not currently participating in the CLP is selected, methods consistent with CLP methods that would be used at this Site for the purposes proposed and QA/QC procedures approved by EPA shall be used. In addition, if the laboratory is not in the CLP program, a laboratory QA program must be submitted for EPA review and approval granted prior to the shipment of Site samples to that laboratory for analysis.

Health and Safety Plan

A Health and Safety Plan shall be prepared in conformance with the Respondent health and safety program, and in compliance with OSHA regulations and protocols. The Health and Safety Plan shall include the eleven elements described in the RI/FS Guidance, such as a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and site control.

It should be noted that EPA does not "approve" the Respondent Health and Safety Plan, but rather EPA reviews it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment.

TASK 2 - COMMUNITY RELATIONS

The development and implementation of community relations activities are the responsibility of EPA. The critical community relations planning steps performed by EPA include conducting community interviews and developing a community relations plan. Although implementation of the community relations plan is the responsibility of EPA, if requested by EPA, the Respondent shall assist EPA by providing information regarding the history of the Site and participating in public meetings. In addition, the Respondent shall prepare a plan (hereinafter referred to as the Technical Assistance Plan or TAP), subject to EPA's approval, for providing and administering up to $50,000.00 of the Respondent's money to fund qualified citizen groups to hire technical advisors, independent from the Respondent to help interpret and comment on Site-related documents developed under this SOW. Within thirty (30) days after the effective date of this Consent Order, the Respondent shall submit to EPA its Technical Assistance Plan.

As part of the Technical Assistance Plan, the Respondent must propose a method, including an application process and eligibility criteria, for awarding and administering the funds above. Any eligible citizen group must be: 1) a representative group of individuals potentially affected by the Site, 2) incorporated as a nonprofit organization for the purposes of the Site or established as a charitable organization that operates within the geographical range of the Site and is already incorporated as a nonprofit organization, and 3) able to demonstrate its capability to adequately and responsibly manage any funds awarded. Any group is ineligible if it is: 1) potentially responsible for contamination problems at the Site, 2) an academic institution, 3) a political subdivision, or 4) a group established or sustained by government entities, a Potentially Responsible Party, or any ineligible entity. Funds may be awarded to only one qualified group for purposes of this Consent Order and Statement of Work. In addition, at a minimum, the technical advisor must possess the following credentials: 1) Demonstrated knowledge of hazardous or toxic wastes issues by proven work experience in such fields in excess of five (5) years; 2) A bachelor of science in a relevant discipline (e.g., biochemistry, toxicology, environmental sciences, engineering); 3) Ability to translate technical information into terms understandable to lay persons; (4) Experience in making technical presentations in a public meeting or hearing setting; and (5) Demonstrated writing skills. Any unobligated funds shall revert to the Respondent upon EPA's written acceptance of the Completion of Phase work.

For purposes of resolving any disputes that may arise between the Respondent the technical advisor, and/or the selected citizen group concerning the administration and/or use of the funds under the TAP, the Respondent shall, as part of their TAP, propose a method for resolution, which will include the use of an impartial third-party arbitrator. As part of the dispute resolution proposal, the Respondent must provide the method for selecting a third-party arbitrator that allows for the selection of an arbitrator acceptable to all parties involved in the dispute. Additionally, the dispute resolution provision must require that before the services of an arbitrator are invoked, the parties comply with the following procedures: (1) the party that raises a complaint must submit that complaint in writing to the party who is the subject of the complaint; (2) the recipient of the complaint must provide the first party with a written response within fifteen (15) calendar days of receipt of the complaint; (3) the parties then have fifteen (15) calendar days to resolve the dispute; and (4) if the disagreement cannot be resolved at this level, then the services of a third-party arbitrator will be sought. The written decision of the arbitrator will be the final decision.

The Respondent may hire a third party to coordinate and administer the TAP (hereinafter referred to as the TAP Coordinator). However, any such TAP Coordinator must be approved by EPA. It is the Respondent's burden to demonstrate that the TAP Coordinator is qualified to perform this task. If the Respondent opts to hire a TAP Coordinator, they must submit in writing that person's name, title, and qualifications to EPA within fifteen (15) days of the effective date of this Consent Order. Additionally, the Respondent must designate within fifteen (15) days of the effective date of this Consent Order an outreach coordinator who will be responsive to the public's inquiries and questions about the Site, including information about the application process and administration of the TAP.

To the extent practicable, the Respondent shall have selected the TAP recipient and administered the appropriate funds to such group at least by the date on which the Draft RI/FS Workplan is due to EPA.

The extent of the Respondent's involvement in community relations activities is left to the discretion of EPA. In addition to devising and administering the Technical Assistance Plan, all other community relations responsibilities EPA may assign to the Respondent shall be specified in the community relations plan. All community relations activities conducted by Respondent shall be subject to oversight by EPA. In addition, the Respondent must provide EPA monthly progress reports regarding the implementation of the TAP.

It is important to note that the State of Florida requires the posting of Warning Signs at Superfund site by Potentially Responsible Parties (see Florida Administrative Code Chapter 17-736).

TASK 3 - SITE CHARACTERIZATION

As part of the RI, the Respondent shall perform the activities described in this task, including the preparation of a Site Characterization Summary and a RI Report. The overall objective of Site Characterization is to describe areas of the Site that may pose a threat to human health or the environment. This objective is accomplished by first determining physiography, geology, and hydrology of the Site. Surface and subsurface pathways of migration shall also be defined. The Respondent shall identify the sources of contamination and define the nature, extent, and volume of the sources of contamination, including their physical and chemical constituents as well as their concentrations at incremental locations in the affected media. The Respondent shall also investigate the extent of migration of this contamination as well as its volume and any changes in its physical or chemical characteristics. This investigation will provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, contaminant fate and transport shall be determined and projected.

During this phase of the RI/FS, the Work Plan, SAP, and Health and Safety Plan shall be implemented. Field data shall be collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondent shall notify EPA at least two weeks in advance of the field work regarding the planned dates for field activities, including installation of monitoring wells, installation and calibration of equipment, pump tests, field lay out of any sampling grid, excavation, sampling and analysis activities, and other field investigation activities. The Respondent shall demonstrate that the laboratory and type of laboratory analyses that will be utilized during Site Characterization meets the specific QA/QC requirements and the DQOs as specified in the SAP. In view of the unknown conditions at the Site, activities are often iterative and, to satisfy the objectives of the RI/FS, it may be necessary for the Respondent to supplement the work specified in the initial Work Plan. In addition to the deliverables below, the Respondent shall provide a monthly progress report and participate in meetings with EPA at major points in the RI/FS.

a. Field Investigation

The field investigation includes the gathering of data to define physical characteristics, sources of contamination, and the nature and extent of contamination at the Site. These activities shall be performed by the Respondent in accordance with the Work

Plan and SAP. At a minimum, this investigation shall include the following activities:

Implementing and Documenting Field Support Activities

The Respondent shall initiate field support activities following approval of the Work Plan and SAP. Field support activities may include obtaining access to the Site, property surveys, scheduling, and procuring equipment, office space, laboratory services, utility services and/or contractors. The Respondent shall notify EPA at least two weeks prior to initiating field support activities so that EPA may adequately schedule oversight tasks. The Respondent shall also notify EPA in writing upon completion of field support activities.

Investigating and Defining Site Physical and Biological Characteristics

The Respondent shall collect data on the physical and biological characteristics of the Site and its surrounding areas including the physiography, geology, and hydrology, and specific physical characteristics identified in the Work Plan. This information shall be ascertained through a combination of physical measurements, observations, and sampling efforts and shall be utilized to define potential transport pathways and receptor populations. In defining the physical characteristics of the Site, the Respondent shall also obtain sufficient engineering data (such as pumping characteristics, soil particle size, permeability, etc.) for the projection of contaminant fate and transport and the development and screening of Remedial Action Alternatives, including information necessary to evaluate treatment technologies.

Defining Sources of Contamination

The Respondent shall locate each source of contamination. For each location, the lateral and vertical extent of contamination shall be determined by sampling at incremental depths on a sampling grid or in another organized fashion approved by EPA. The physical characteristics and chemical constituents and their concentrations shall be determined for all known and discovered sources of contamination. The Respondent shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the QA/QC plan and DQOs. Sources of contamination shall be analyzed for the potential of contaminant release (e.g., long term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information necessary to evaluate treatment technologies.

Describing the Nature and Extent of Contamination

The Respondent shall gather information to describe the nature and extent of contamination as a final step during the field investigation. To describe the nature and extent

of contamination, the Respondent shall utilize the information on Site physical characteristics and sources of contamination to give a preliminary estimate of the contaminants that may have migrated. The Respondent shall then implement an iterative monitoring program and any study program identified in the Work Plan or SAP such that, by using analytical techniques sufficient to detect and quantify the concentration of contaminants, the migration of contaminants through the various media at the Site can be determined. In addition, the Respondent shall gather data for calculations of contaminant fate and transport. This process is continued until the lateral and vertical extent of contamination has been determined to the contaminant concentrations consistent with the established DQOs set forth in the QAAP. EPA shall use the information on the nature and extent of contamination to determine the level of risk presented by the Site. Respondent shall use this information to help to determine aspects of the appropriate Remedial Action Alternatives to be evaluated.

b. Data Analyses

Evaluate Site Characteristics

The Respondent shall analyze and evaluate the data to describe: (1) physical and biological characteristics of the Site; (2) contaminant source characteristics; (3) nature and extent of contamination; and (4) contaminant fate and transport. The information on physical and biological characteristics, source characteristics, and nature and extent of contamination shall be used in the analysis of contaminant fate and transport. The evaluation shall include the actual and potential magnitude of releases from the sources and lateral and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models shall be identified to EPA in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis. All models shall be approved by EPA prior to their use. The RI data shall be presented in a computer disk format utilizing Lotus 1-2-3 or other equivalent commonly used computer software to facilitate EPA's preparation of the Baseline Risk Assessment. Respondent shall then collect any data identified by EPA as necessary to fill data gaps that EPA determines are present during preparation of the Baseline Risk Assessment (see "Guidance for Data Useability in Risk Assessment," U.S. EPA, Office of Emergency and Remedial Response, October 1990, OSWER Directive No. 9285.7-05). Also, this evaluation shall provide any information relevant to characteristics of the Site necessary for evaluation of the need for remedial action in EPA's Baseline Risk Assessment, the development and evaluation of Remedial Action Alternatives, and the refinement and identification of ARARs. Analyses of data

collected for Site Characterization shall meet the DQOs developed in the QAPP.

c. Data Management Procedures

The Respondent shall consistently document the quality and validity of field and laboratory data compiled during the RI. At a minimum, this documentation shall include the following activities:

Documenting Field Activities

Information gathered during characterization of the Site shall be consistently documented and adequately recorded by the Respondent in well maintained field logs and laboratory reports. The method(s) of documentation must be specified in the Work Plan and/or the SAP. Field logs must be utilized to document observations, calibrations, measurements, and significant events that have occurred during field activities. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies. Supporting documentation described as the "CLP Data Package" must be provided with the sample analysis for all samples split or duplicated with EPA.

Maintaining Sample Management and Tracking

The Respondent shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the development and evaluation of the Baseline Risk Assessment and Remedial Action Alternatives. Analytical results developed under the Work Plan shall not be included in any characterization reports for the Site unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent shall establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

d. Site Characterization Deliverables

The Respondent shall prepare the Preliminary Site Characterization Summary and the Remedial Investigation Report.

Preliminary Site Characterization Summary

After completing field sampling and analysis, the Respondent shall prepare a concise Site Characterization Summary. This summary shall review the investigative activities that have taken place and describe and display data for the Site documenting the location and characteristics of surface and subsurface features and contamination at the Site including

the affected medium, location, types, physical state, and quantity and concentrations of contaminants. In addition, the location, dimensions, physical condition, and varying concentrations of each contaminant throughout each source and the extent of contaminant migration through each of the affected media shall be documented. The RI data shall be presented in a computer disk format utilizing Lotus 1-2-3 or other equivalent commonly used computer software to facilitate EPA's preparation of the Baseline Risk Assessment. The Site Characterization Summary shall provide EPA with a preliminary reference for developing the Baseline Risk Assessment and remediation goals, evaluating the development and screening of Remedial Action Alternatives, and the refinement and identification of ARARs.

Remedial Investigation (RI) Report

The Respondent shall prepare and submit a Draft RI Report to EPA for review and approval. This report shall summarize results of field activities to characterize the Site, sources of contamination, nature and extent of contamination, and the fate and transport of contaminants. The Respondent shall refer to the RI/FS Guidance for an outline of the report format and contents. Following comment by EPA, the Respondent shall prepare a Final RI Report which satisfactorily addresses EPA's comments.

TASK 4 - TREATABILITY STUDIES

Treatability Studies shall be performed by the Respondent to assist in the detailed analysis of alternatives. If applicable, study results and operating conditions will later be used in the detailed design of the selected remedial technology. The following activities shall be performed by the Respondent.

a. Determination of Candidate Technologies and the Need for Treatability Studies

The Respondent shall identify in a technical memorandum, subject to EPA review and comment, candidate technologies for a Treatability Studies program during project planning (Task 1). The listing of candidate technologies shall cover the range of technologies required for alternatives analysis (Task 5a). The specific data requirements for the Treatability Studies program shall be determined and refined during Site Characterization and the development and screening of Remedial Action Alternatives (Tasks 3 and 4, respectively).

Conduct Literature Survey and Determine the Need for Treatability Studies

The Respondent shall conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate

technologies. If practical candidate technologies have not been sufficiently demonstrated, or cannot be adequately evaluated for the Site on the basis of available information, Treatability Studies shall be conducted. EPA shall determine whether Treatability Studies will be required.

Evaluate Treatability Studies

Where EPA has determined that Treatability Studies are required, the Respondent and EPA shall decide on the type of Treatability Studies to use (e.g., bench versus pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as to perform testing for various operating conditions, the decision to perform pilot testing shall be made as early in the process as possible to minimize potential delays of the FS. To assure that a Treatability Study program is completed on time, and with accurate results, the Respondent shall either submit a separate Treatability Study Work Plan or an amendment to the original RI/FS Work Plan for EPA review and approval.

b. Treatability Study Deliverables

In addition to the memorandum identifying candidate technologies, the deliverables that are required when Treatability Studies are to be conducted include a Treatability Study Work Plan, a Treatability Study Sampling and Analysis Plan, and a Final Treatability Study Evaluation Report. EPA may also require a Treatability Study Health and Safety Plan, where appropriate.

Treatability Study Work Plan

The Respondent shall prepare a Treatability Study Work Plan or amendment to the original RI/FS Work Plan for EPA review and approval. This Plan shall describe the background of the Site, remedial technologies to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for Treatability Studies shall be documented as well. If pilot-scale Treatability Studies are to be performed, the Treatability Study Work Plan shall describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, and operating conditions to be tested. If testing is to be performed off-site, permitting requirements must be addressed.

Treatability Study Sampling and Analysis Plan

If the original QAPP or FSAP is not adequate for defining the activities to be performed during the Treatability Studies, a separate Treatability Study SAP or amendment to the original RI/FS SAP shall be prepared by the Respondent

for EPA review and approval. It shall be designed to monitor pilot plant performance. Task 1c of this Scope of Work provides additional information on the requirements of the SAP.

Treatability Study Health and Safety Plan

If the original RI/FS Health and Safety Plan is not adequate for defining the activities to be performed during the Treatability Studies, a separate or amended Health and Safety Plan shall be developed by the Respondent. Task 1c of this Scope of Work provides additional information on the requirements of the Health and Safety Plan. EPA does not "approve" the Treatability Study Health and Safety Plan.

Treatability Study Evaluation Report

Following completion of Treatability Studies, the Respondent shall analyze and interpret the testing results in a technical report to EPA. Depending on the sequence of activities, this report may be a part of the RI/FS Report or a separate deliverable. The report shall evaluate each technology's effectiveness, implementability, cost, and actual results as compared with predicted results. The report shall also evaluate full-scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

TASK 5 - DEVELOPMENT AND SCREENING OF REMEDIAL ACTION ALTERNATIVES

The development and screening of Remedial Action Alternatives is performed to select an appropriate range of waste management options to be evaluated. This range of options shall include, at a minimum, alternatives in which treatment is used to reduce the toxicity, mobility, or volume of the waste, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; alternatives that involve containment and treatment components; alternatives that involve containment with little or no treatment; and a no-action alternative. The following activities shall be performed by the Respondent as a function of the development and screening of Remedial Action Alternatives.

a. Development and Screening of Remedial Action Alternatives

The Respondent shall begin to develop and evaluate, concurrent with the RI Site Characterization task, a range of appropriate waste management options that, at a minimum, ensure protection of human health and the environment and comply with all ARARs.

Refine and Document Remedial Action Objectives

The Respondent shall review and, if necessary, propose refinement to the Site Objectives and preliminary remedial action objectives that were established during the Scoping

phase (Task 1). Any revised Site Objectives or revised remedial action objectives shall be documented in a technical memorandum as discussed in Task 1b. These objectives shall specify the contaminants and media of interest, exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each exposure route).

Develop General Response Actions

The Respondent shall develop general response actions for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singly or in combination, to satisfy the remedial action objectives.

Identify Areas and Volumes of Media

The Respondent shall identify areas and volumes of media to which general response actions may apply, taking into account requirements for protectiveness as identified in the remedial action objectives. The chemical and physical characterization of the Site and the Baseline Risk Assessment and remediation goals shall also be taken into account.

Identify, Screen, and Document Remedial Technologies

The Respondent shall identify and evaluate technologies applicable to each general response action to eliminate those that cannot be implemented at the Site. General response actions shall be refined to specify remedial technology types. Technology process options for each of the technology types shall be identified either concurrent with the identification of technology types or following the screening of the considered technology types. Process options shall be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative processes for each technology type. The technology types and process options shall be summarized for inclusion in a technical memorandum. The reasons for eliminating alternatives must be specified.

Assemble and Document Alternatives

The Respondent shall assemble selected representative technologies into alternatives for each affected medium or operable unit. Together, all of the alternatives shall represent a range of treatment and containment combinations that shall address either the Site or the operable unit as a whole. A summary of the assembled alternatives and their related action-specific ARARs shall be prepared by the Respondent for inclusion in a technical memorandum. The reasons for eliminating alternatives during the preliminary screening process must be specified.

TASK 6 - DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

The detailed analysis shall be conducted by the Respondent to provide EPA with the information needed to allow for the selection of a remedy for the Site.

a. Detailed Analysis of Alternatives

The Respondent shall conduct a detailed analysis of remaining alternatives. This analysis shall consist of an assessment of each option against a set of nine evaluation criteria and a comparative review of all options using the same nine evaluation criteria as a basis for comparison.

Apply Nine Criteria and Document Analysis

The Respondent shall apply nine evaluation criteria to the assembled Remedial Action Alternatives to ensure that the selected Remedial Action Alternative will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State acceptance; and (9) community acceptance. Criteria 8 and 9 are considered after the RI/FS Report has been released to the general public. For each alternative, the Respondent shall provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative; and (2) a discussion of the individual criterion assessment. Since the Respondent do not have direct input on criteria (8) State acceptance and (9) community acceptance, these two criteria will be addressed by EPA after completion of the Draft FS Report.

Compare Alternatives Against Each Other and Document the Comparison of Alternatives

The Respondent shall perform a comparative analysis among the Remedial Action Alternatives. That is, each alternative shall be compared against the others using the nine evaluation criteria as a basis of comparison. No alternative shall be identified by Respondent as the preferred alternative in the Feasibility Study. Identification and selection of the preferred alternative is conducted by EPA.

b. Detailed Analysis Deliverables

The Respondent shall prepare a Draft FS Report for EPA review and comment. This report, as ultimately adopted or amended by EPA, provides a basis for remedy selection by EPA and documents the development and analysis of Remedial Action Alternatives. The Respondent shall refer to the RI/FS Guidance for an outline of the report format and the required report content. The Respondent shall prepare a Final FS Report which satisfactorily addresses EPA's comments. Once EPA's comments have been addressed by the Respondent to EPA's satisfaction and EPA approval has been obtained or an amendment has been furnished by EPA, the Final FS Report may be bound with the Final RI Report.

ATTACHMENT A
REFERENCES

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process:

1. The National Oil and Hazardous Substances Pollution Contingency Plan, March 8, 1990.

2. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final" U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01.

3. "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

4. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, OSWER Directive No. 9835.3.

5. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

6. "EPA NEIC Policies and Procedures Manual," May 1978, revised November 1984, EPA-330/9-78-001-R.

7. "Data Quality Objectives for Remedial Response Activities," U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

8. "Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.

9. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.

10. "Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, December 1986.

11. "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

12. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (Draft), OSWER Directive No. 9234.1-01 and -02.

13. "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (Draft), OSWER Directive No. 9283.1-2.

14. "Draft Guidance on Preparing Superfund Decision Documents," U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355.3-02

15. "Interim Final Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual, Part A," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-89/002A, December 1989, OSWER Directive No. 9285.7-01a.

16. "Interim Final Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual, Part B," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-89/002B, OSWER Directive No. 9285.7-01b.

17. "Interim Final Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual, Part C," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-89/002C, OSWER Directive No. 9285.7-01c.

18. "Interim Final Risk Assessment Guidance for Superfund - Volume II - Environmental Evaluation Manual," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-89/001, March 1989, OSWER Directive No. 9285.7-01.

19. "Superfund Exposure Assessment Manual," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-88/001, April 1988, OSWER Directive No. 9285.5-1.

20. "Guidance for Data Useability in Risk Assessment," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/G-90/008, October 1990, OSWER Directive No. 9285.7-05.

21. "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions," April 22, 1991, OSWER Directive No. 9355.0-30.

22. "Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

23. OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December 19, 1986).

24. "Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement, March 1, 1989, OSWER Directive No. 9833.3A.

25. "Community Relations in Superfund: A Handbook," U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9230.0-3B.

26. "Community Relations During Enforcement Activities And Development of the Administrative Record," U.S. EPA, Office of Waste Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1A.

27. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual", U.S. EPA Region IV, Environmental Services Division, February 1, 1991 (revised periodically).

28. "USEPA Contract Laboratory Program Statement of Work for Organics Analysis", U.S. EPA, Office of Emergency and Remedial Response, February 1988.

29. "USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis", U.S. EPA, Office of Emergency and Remedial Response, July 1988.

ATTACHMENT B
SUMMARY OF THE MAJOR DELIVERABLES FOR THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THE KERR-MCGEE CHEMICAL LLC SITE

TASK	DELIVERABLE	EPA RESPONSE
TASK 1	SCOPING	
	- RI/FS Work Plan (15)	Review and Approve
	- Field Sampling and Analysis Plan (15)	Review and Approve
	- Quality Assurance Project Plan (5)	Review and Approve
	- Site Health and Safety Plan (5)	Review and Comment
TASK 2	Community Relations	
	-Technical Assistance Plan (TAP)	Review and Approve
TASK 3	SITE CHARACTERIZATION	
	- Technical Memorandum on Contaminant Fate and Transport Modeling (where appropriate) (5)	Review and Approve
	- Preliminary Site Characterization Summary (15)	Review and Comment
	- Remedial Investigation (RI) Report (15)	Review and Approve
TASK 4	TREATABILITY STUDIES	
	- Technical Memorandum Identifying Candidate Technologies (10)	Review and Comment
	- Treatability Study Work Plan (or amendment to original Work Plan) (10)	Review and Approve
	- Treatability Study SAP (or amendment to original SAP) (10)	Review and Approve

	- Treatability Study Evaluation Report (10)	Review and Approve
TASK 5	DEVELOPMENT AND SCREENING OF REMEDIAL ACTION ALTERNATIVES	
	- Technical Memorandum Documenting Revised Remedial Action Objectives (5)	Review and Approve
	- Technical Memorandum on Remedial Technologies, Alternatives, and Screening (5)	Review and Comment
TASK 6	DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES	
	- Feasibility Study (FS) Report (15)	Review and Approve

Note: The number in parenthesis indicates the number of copies to be submitted by Respondent. One copy shall be unbound, the remainder shall be bound. Also, see the Administrative Order on Consent for additional reporting requirements and further instructions on submittal and dispositions of deliverables.

ATTACHMENT C
GENERAL SCHEDULE FOR THE MAJOR
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY ACTIVITIES
AT THE KERR-MCGEE CHEMICAL LLC SITE

ACTIVITY	SCHEDULE DATE (DAYS)
Effective Date of AOC	X
Supervising Contractor Selected TAP Coordinator's qualifications submitted To EPA Designate Outreach Coordinator	X+15
TAP submitted	X+30
Draft RI/FS Workplan and Associated Documents Submitted	X+45
Draft Treatability Study Work Plan Submitted	X+45
Final RI/FS Workplan and Associated Documents Submitted	X+120
Final Treatability Study Work Plan Submitted	X+120
Initiate Fieldwork	X+150
Fieldwork Complete	X+195
Preliminary Site Characterization Summary Submitted	X+245
Draft RI Submitted	X+280
Final RI Submitted	X+340
Draft FS and Draft Treatability Study Report Submitted	X+400
Final FS and Final Treatability Study Report Submitted	X+475

Note: Other deliverables listed in Attachment B shall also be incorporated into the schedule to be submitted as part of the RI/FS Work Plan.

October 29, 1999

Via E-Mail

To: John Satterfield, PMP, REM
Kerr-McGee Chemical, LLC

Subject: Submission of Sampling Data to EPA

Hi John:

It was good seeing you again on Thursday Oct. 28. During our meeting, you had asked if we wanted raw data or only sampling data that you all had already done the qa/qc analysis on. Here's the answer:

We would like the following raw data so that we can conduct QA/QC at the same time that you are. We are using this type of comparison in lieu of "split sampling:"

For 20 samples or less, we want the total CLP Package, i.e. 100% of the samples, chromatographs, etc.

For more than 20 samples, we want 10% of the samples including all CLP data, chromatographs, etc.

If you have any questions, please call me at 404-562-8934.

Sincerely,

John Blanchard, P.E.
Remedial Project Manager

cc: Rudy Tanasijevich, EPA
Roger Carlton, EPA

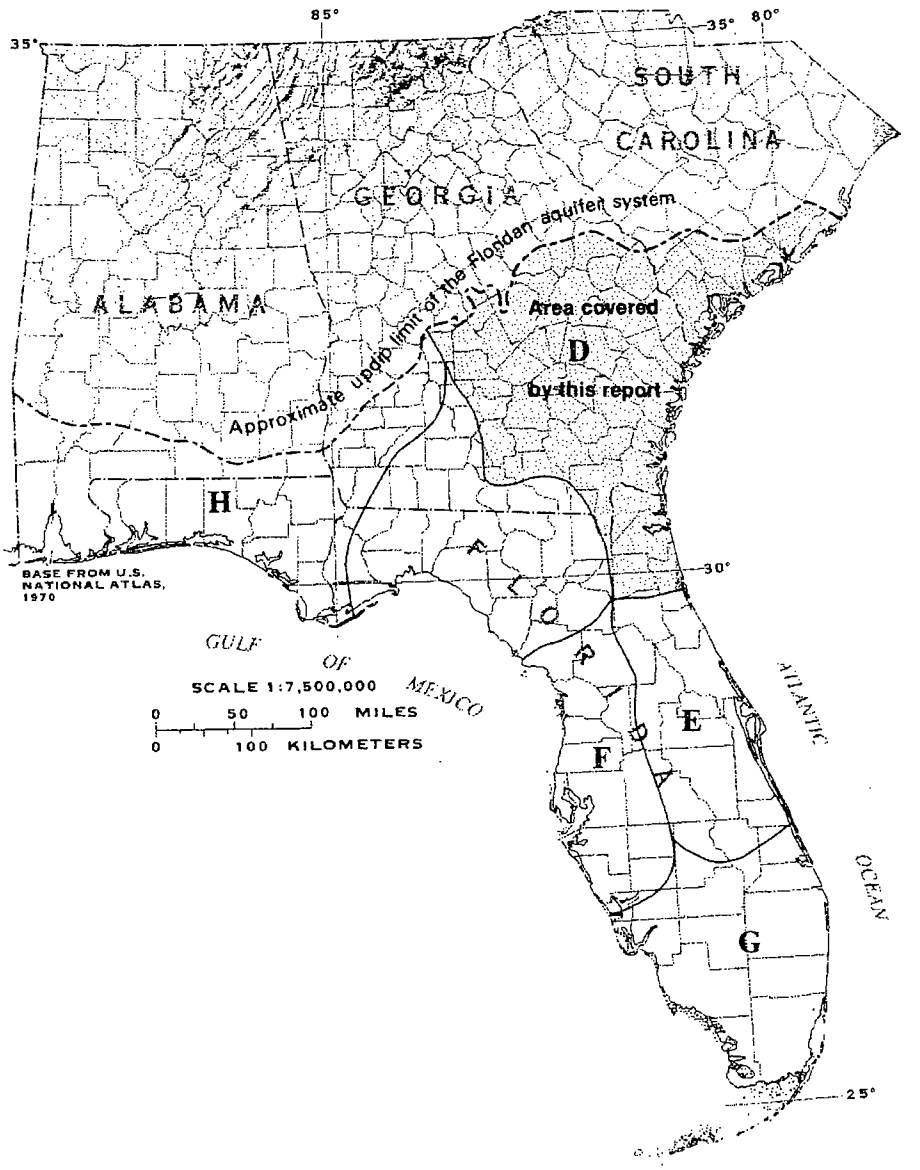
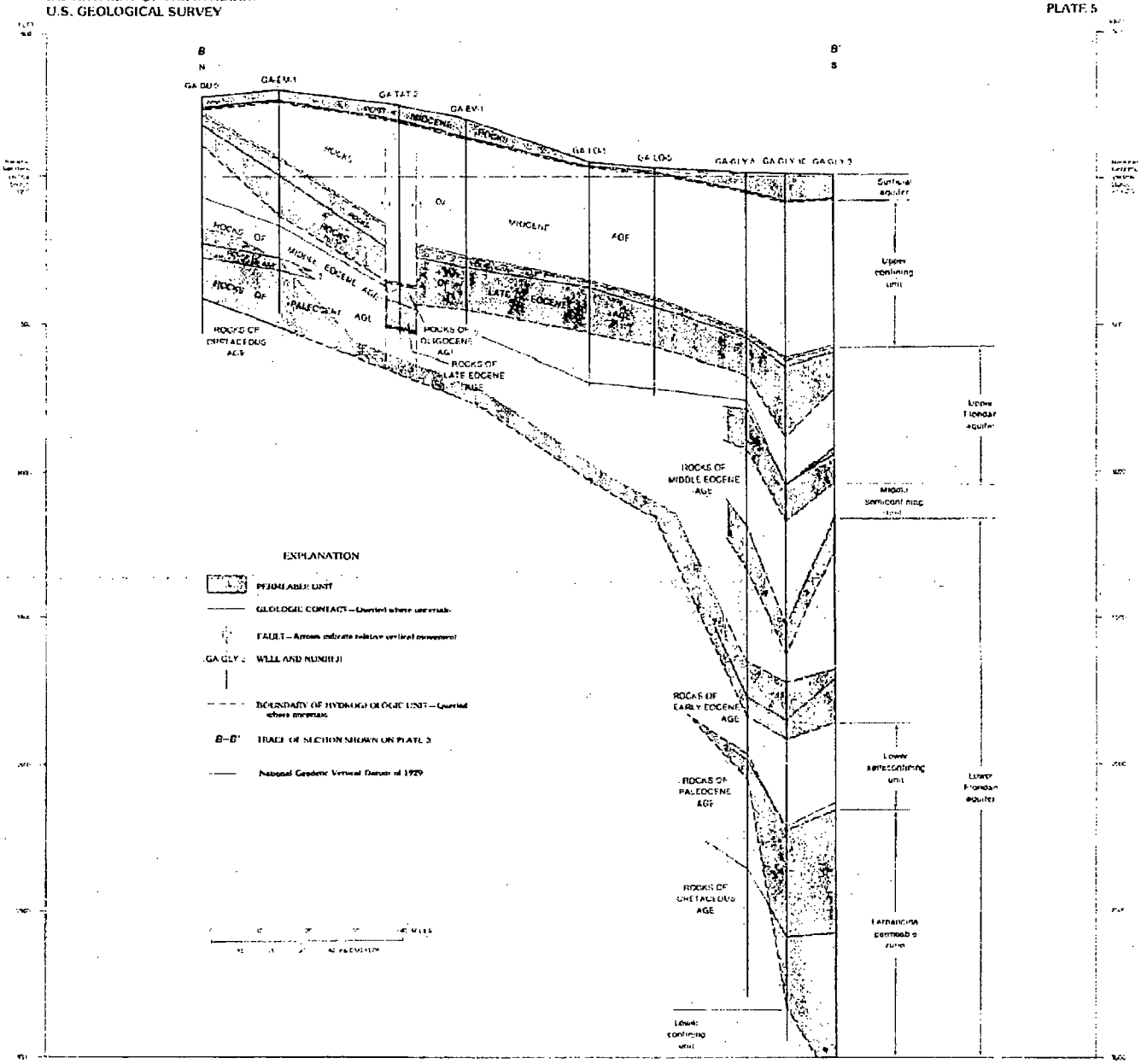


FIGURE 1.—Location of Floridan aquifer system study area, subregional project areas, and chapter designations in Professional Paper 1403.

for use in further investigations of the aquifer system. Because distinct, regionally mappable hydrogeologic units occur within the carbonate sequence, the term "aquifer system" is preferred to "aquifer." Use of "system" follows Poland and others (1972, p. 2), who stated that an aquifer system "* * * comprises two or more permeable beds separated at least locally by [confining beds] that impede ground-water movement but do not greatly affect the regional hydraulic continuity of the system." This definition applies to the Floridan aquifer system throughout most of its area of occurrence. (See table 1 for a summary of historical terminology and stratigraphy applied to the Floridan aquifer system.)

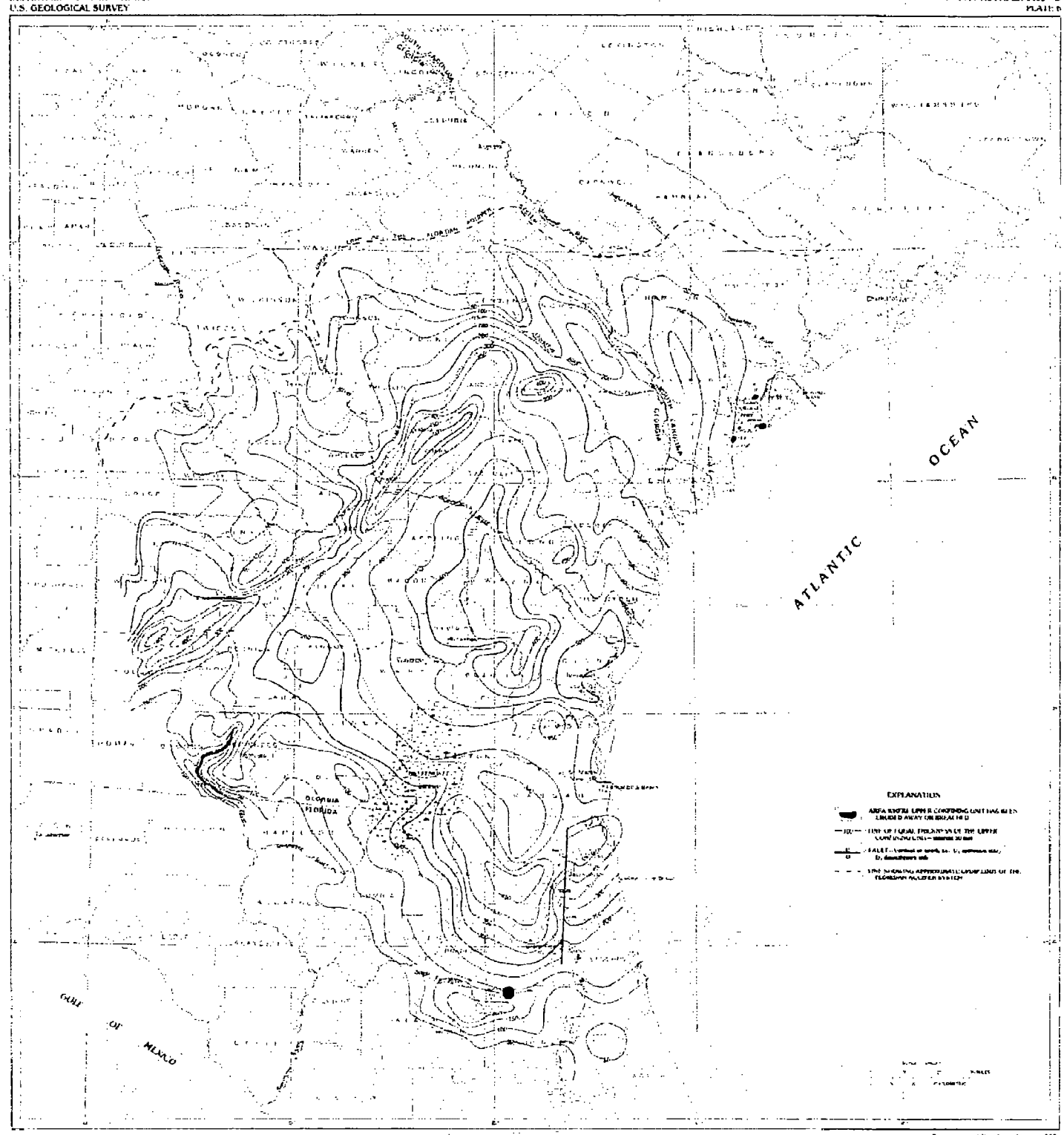
PURPOSE AND SCOPE

The overall purpose of this study was to describe the Floridan aquifer system in southeast Georgia and adjacent parts of Florida and South Carolina. Specifically, the objectives of the study were to (1) describe and



Hydrogeology modified from Miller (1986)

GENERALIZED HYDROGEOLOGIC SECTION SHOWING FLORIDAN AQUIFER SYSTEM APPROXIMATELY ALONG DIP, EAST-CENTRAL TO SOUTHEAST GEORGIA

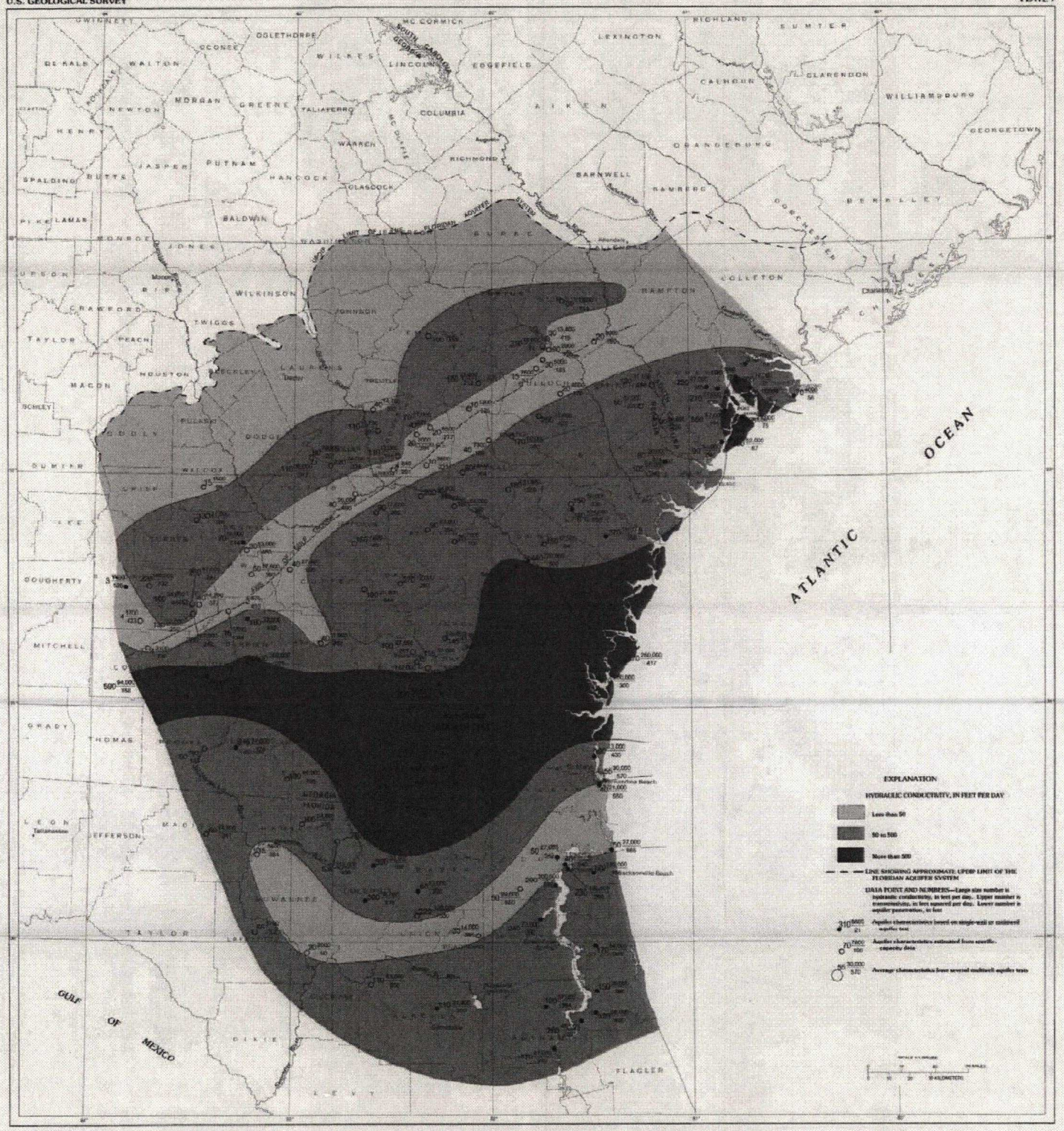


Geology modified from Miller (1986).
Brooks-Luannes Columns, Ga., drag from Krause (1979).

THICKNESS OF THE UPPER CONFINING UNIT OF THE FLORIDAN AQUIFER SYSTEM IN SOUTHEAST GEORGIA AND ADJACENT PARTS OF FLORIDA AND SOUTH CAROLINA

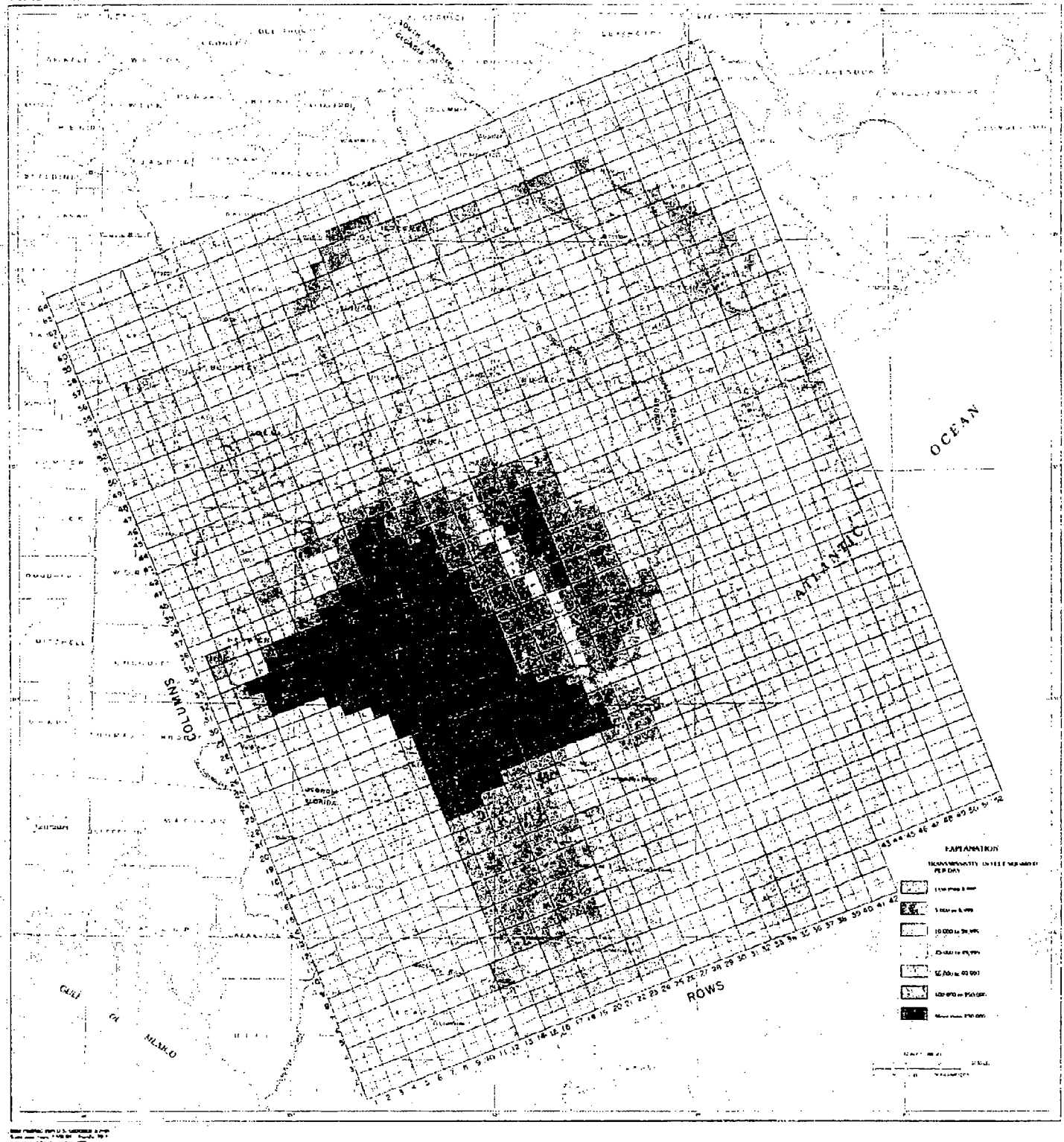
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PROFESSIONAL PAPER 1403—D
PLATE 7

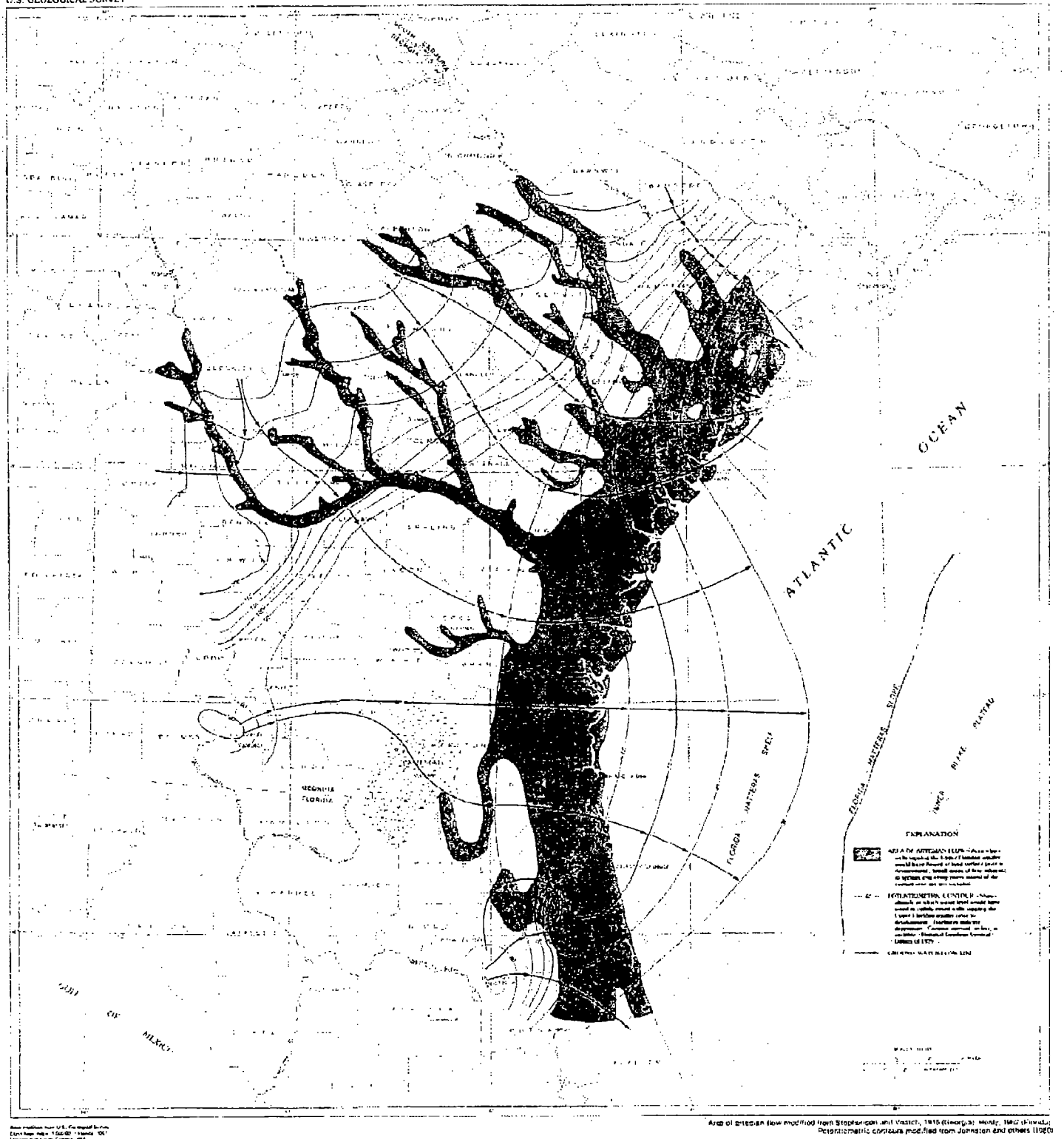


Base modified from U.S. Geological Survey state base maps, 1:500,000 - Florida, 1967; Georgia and South Carolina, 1970

FIELD VALUES OF HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY OF THE UPPER FLORIDAN AQUIFER IN SOUTHEAST GEORGIA AND ADJACENT PARTS OF FLORIDA AND SOUTH CAROLINA

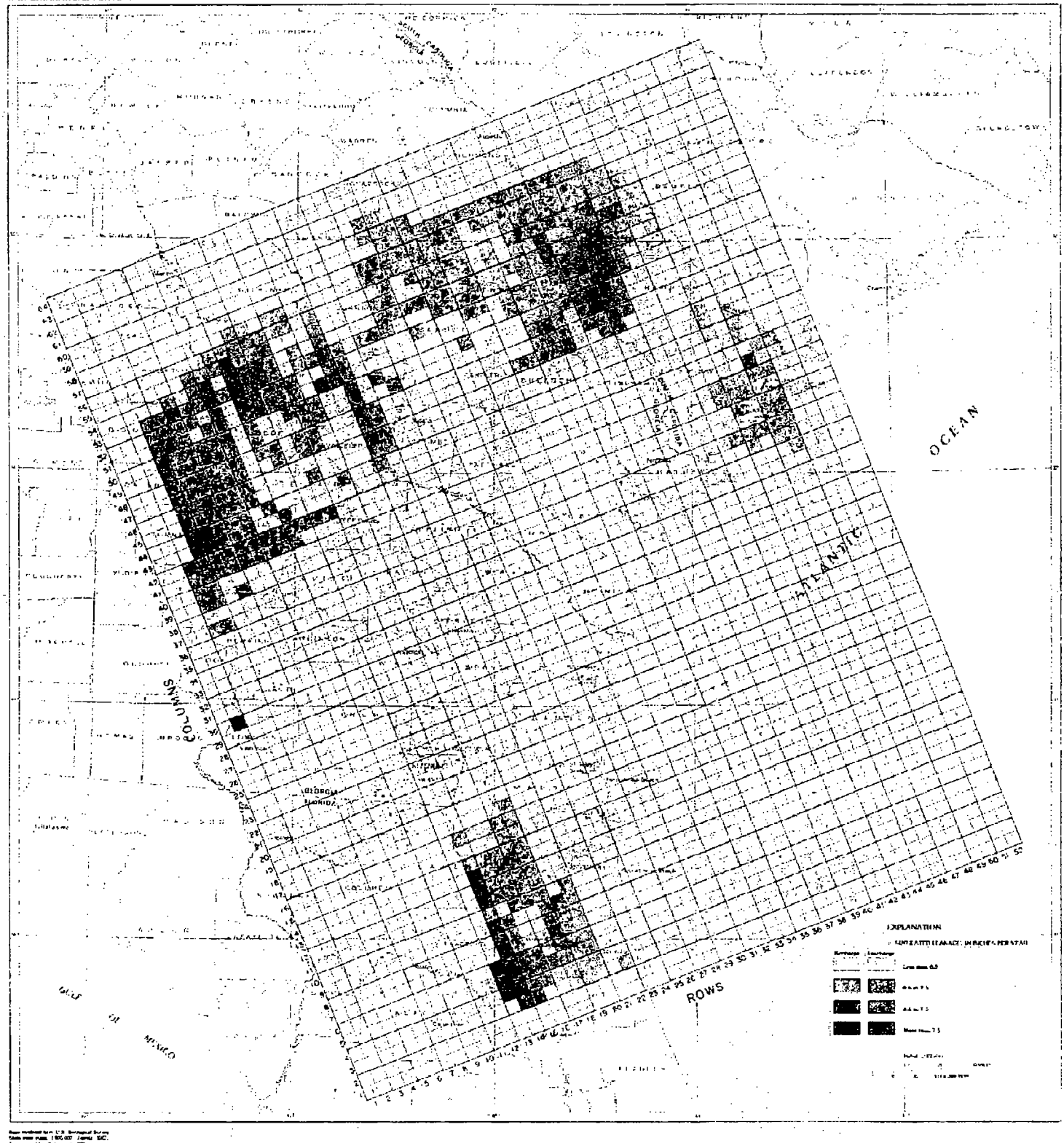


TRANSMISSIVITY DISTRIBUTION, BASED ON SIMULATION, OF THE UPPER FLORIDAN AQUIFER IN SOUTHEAST GEORGIA AND ADJACENT PARTS OF FLORIDA AND SOUTH CAROLINA

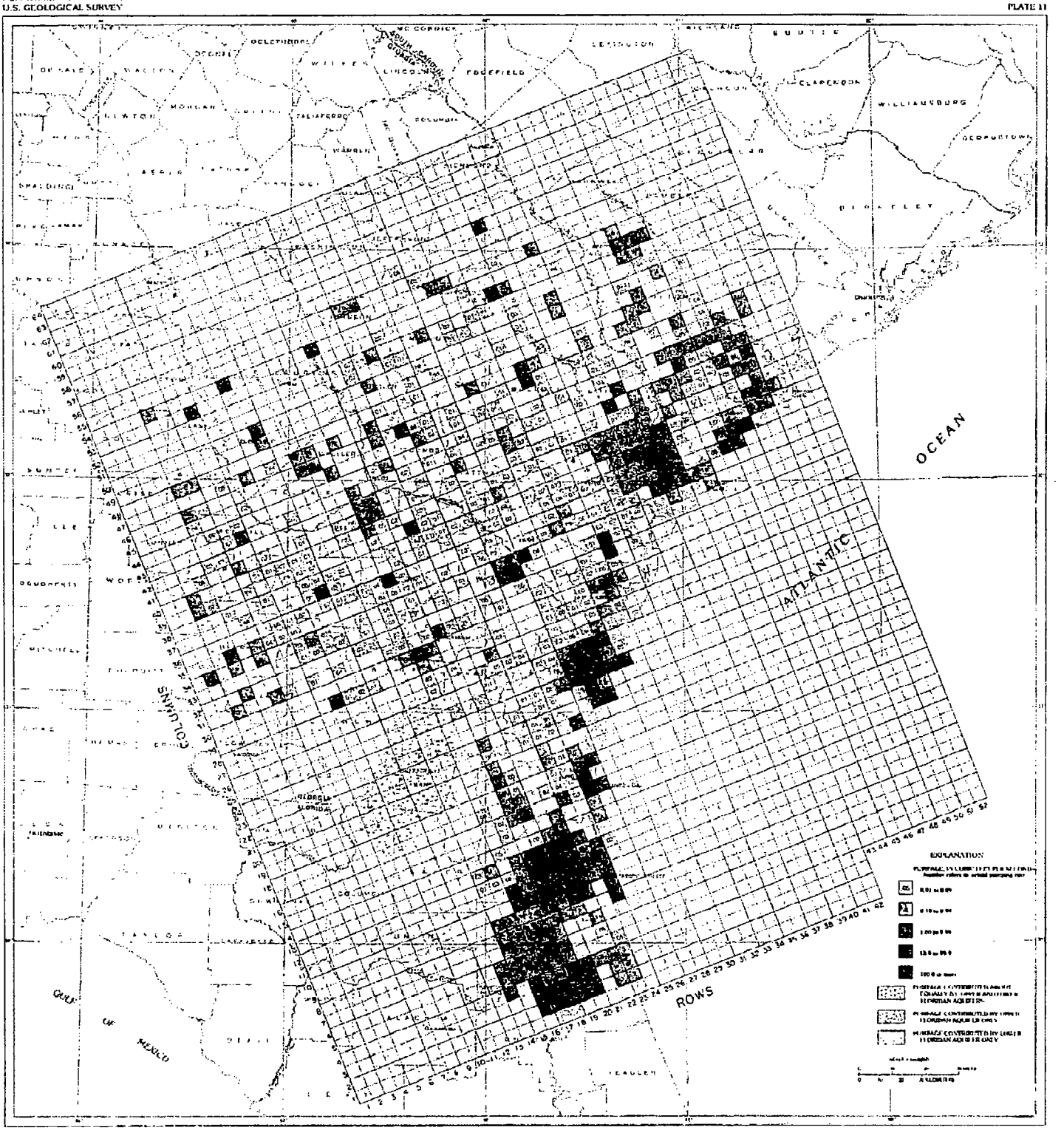


Area of artesian flow modified from Stephenson and Veatch, 1915 (Georgia); Meinzer, 1932 (Florida).
Potentiometric contours modified from Johnston and others (1980)

ESTIMATED POTENTIOMETRIC SURFACE, AREA OF ARTESIAN FLOW, AND FLOW PATHS FOR THE UPPER FLORIDAN AQUIFER IN SOUTHEAST GEORGIA AND ADJACENT PARTS OF FLORIDA AND SOUTH CAROLINA, PRIOR TO DEVELOPMENT



LEAKAGE THROUGH THE UPPER CONFINING UNIT, BASED ON SIMULATION OF THE PREDEVELOPMENT FLOW SYSTEM OF THE FLORIDAN AQUIFER SYSTEM IN SOUTHEAST GEORGIA AND ADJACENT PARTS OF FLORIDA AND SOUTH CAROLINA



DISTRIBUTION OF PUMPAGE, FLORIDAN AQUIFER SYSTEM IN SOUTHEAST GEORGIA AND ADJACENT PARTS OF FLORIDA AND SOUTH CAROLINA, MAY 1980

Reference No.: 60
Kerr-McGee Chemical Corporation
EPA ID No. FLD039049101

Exploring the St. Johns River

There are lots of ways to get **up-close and personal** with the St. Johns River: airboats, flying boats, **houseboats**, kayaks and **scuba diving**. Our film **expedition team** has done all of that, and more. **Explore** with us the river's history, **natural resources** and people.

River Journey

Our intrepid team of **filmmakers** and **scientists** traveled from the mouth of the **St. Johns River**, near Jacksonville, to its headwaters in an **Everglades-like** marsh. Follow the adventure!

Go

River Voices

River Profile

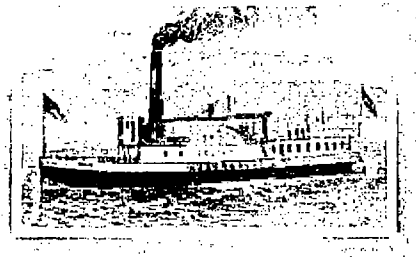
River History

From filmmakers to scientists, fishing guides to gardeners, people from all walks of life are working to protect the St. Johns River. Hear, in their voices, why this river matters.

Go

The St. Johns River is an American Heritage River. Take this interactive tour to experience its riverscape and diverse wildlife, including bald eagles, manatees, stingrays, largemouth bass and more.

Go



Discover the rich history of human contact with the St. Johns River, from Paleo-Indians to Spanish explorers, from steamboat tourists to railroad titans, from drainage canal builders to river restorers.

Go

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Karst Productions

The Water's Journey: The River Returns film is an original film by Karst Productions, Inc.

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▸ RECOMMEND THIS SITE
▸ QUESTIONS AND FEEDBACK
▸ GLOSSARY

EXPLORE THE RIVER PROTECT THE RIVER VISIT THE RIVER FAQ RESOURCES

Visiting the St. Johns River

The St. Johns River was Florida's **first tourist attraction**. Although the **steamboats** that plied its waters in the 1800s have disappeared, the **beauty and mystique** of the river remain. Learn here how you can **experience** the great St. Johns River.

Important Disclaimer

The producers and sponsors of The River Returns make no warranty, promise, or guarantee that the information contained herein is comprehensive or all-inclusive. The information contained here is provided "as is" without warranty of any kind and for general information purposes only. The entire risk as to the results and performance of any information obtained herein is entirely assumed by the recipient.

Public Lands

A great way to experience the St. Johns River is by exploring public lands and state parks that line its banks. Here are a few starting points:

Recreation Guide to District Lands

The St. Johns River Water Management District buys land in order to protect water resources and plant and wildlife habitat. In turn, these lands become available for public recreation and environmental recreation. The SJRWMD has created a comprehensive guide to enjoying public lands under its management, including downloadable maps in PDF format, and can be viewed via this link.

Blue Spring State Park

The largest spring on the St. Johns River, Blue Spring is a designated Manatee Refuge and the winter home (mid-November through March) to a growing population of West Indian Manatees. The spring´s crystal clear, 73´degree water can be enjoyed by swimmers, snorkelers, and certified scuba divers with a partner. Swimming or diving with manatees is not permitted and is strictly enforced. The river is popular for fishing, canoeing, and boating. For more information, visit the Blue Spring State Park website.

Wekiwa Springs State Park

Located at the headwaters of the Wekiva River, the beautiful vistas within this park offer a glimpse of what Central Florida looked like when Timucuan Indians fished and hunted these lands. Just one hour from most central Florida attractions, Wekiva Springs offers visitors the opportunity to relax in a natural setting, enjoy a picnic, or take a swim in the cool spring. Canoeists and kayakers can paddle along the Wekiva River, a major tributary of the St. Johns River. For more information, visit the Wekiwa Springs State Park website.

Houseboat Journeys

There's no better way to immerse yourself in the beauty of the St. Johns River than on a houseboat. Here are a few resources for arranging your own houseboat journey:

River Adventures

The River Returns documentary team spent several weeks cruising the St. Johns River on two 60 ft. long houseboats rented from River Adventures, based in Palatka, FL. For more information, visit the River Adventures website.

Additional Houseboat Resources

SPONSORS:

St. Johns River Water Management District

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The Water's Journey: The River Returns film is an original film by Karst Productions, Inc.

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River Profile - Floura and Fauna

Floura and Fauna | Riverscape Features

Visit the main River Returns web site >>

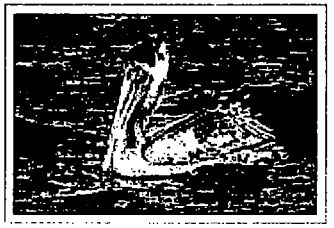
© South Florida Water Management District

White Shrimp

Where the oceans meets the lower St. Johns River is an estuary; in fact, it's Florida's largest at 2,777 square miles. White shrimp, such as this one, spawn offshore but use the river's lower basin as a nursery to mature. Commercial and sport shrimpers operate between Jacksonville and Palatka.

Blue Crab

The blue crab is a St. Johns inhabitant more commonly associated with oceans than rivers. During warmer months, blue crabs move up and down the river, reaching as far south as Lake George. They spawn in cooler months in the lower basin of the River, near the Atlantic Ocean.

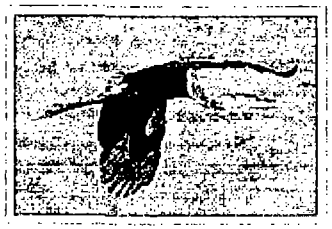


Juvenile Brown Pelican

One of Florida's most widely recognized birds, the prehistoric-looking brown pelican, can be found wintering inland on the St. Johns River, as far south as Lake George. This juvenile floats patiently next to a fishing boat, waiting for a handout.

Great Blue Heron

The great blue heron is one of the river's icons, found throughout the entire length of the St. Johns. With

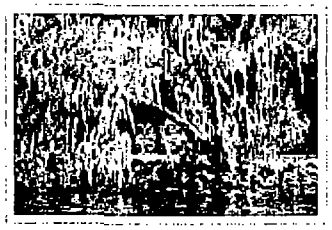


© Jill Heinerth

its long legs, six-foot wingspan, and s-curved neck, this wading bird has an impressive presence in both water and sky, but altogether weighs only five pounds.

Nesting site, Homo Sapien

Homo sapiens are particularly thick in the lower St. Johns basin. Their habitat too often is characterized by removal of natural undergrowth and replacement with non-native grasses requiring fertilizers and pesticides that are harmful to the river, as well as natural flora and fauna.

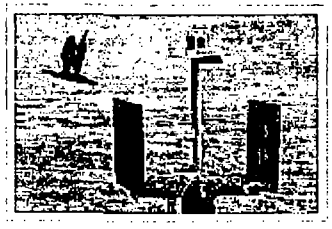


Spanish Moss

A ubiquitous St. Johns River plant is the epiphyte commonly known as Spanish Moss. This lacy gray tangle commonly drapes from the limbs of hardwoods and evergreens along the river. Early citrus shippers used moss as a packing material to protect cargo from bruising.

Wooded Wetland

Some sections along the banks of the St. Johns are high and dry enough to support hardwood forests; much of the river is surrounded by wooded wetland, however. Here, epiphytes grow on the trunks of tupelo and other trees, such as cypress, that like to get their feet wet and therefore thrive in a swamp habitat.

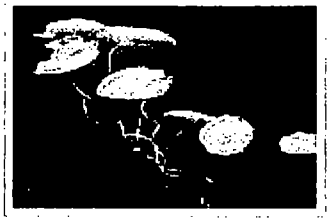


Double-Crested Cormorant

Along the river's length, there's hardly a buoy, snag, or in this case, channel marker, that remains unoccupied for very long by cormorants. These birds are swift flyers and agile swimmers, diving below the surface to catch small fish.

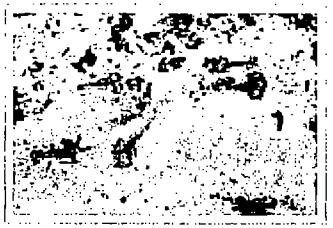
Water Hyacinth

Not long after its well-intentioned introduction to the St. Johns, just south of Palatka in the late 1800s, the prolific water hyacinth formed massive mats that posed navigational nightmares for boats. Florida still spends millions annually on pesticides to control this impossible-to-eradicate invasive, aptly dubbed a "lovely plague."



Lily Pads

The whitish guano of cormorants -- a natural source of nitrogen in the St. Johns River -- is spattered on the leaves of this yellow water lily, one of the "good guys" of aquatic vegetation. The runaway growth of exotics such as hydrilla and hyacinths can crowd out these natives.



Deer Print

The tangled forests covering the banks and hammocks of the St. Johns River provide habitat for a diverse range of mammals, ranging from the stealthy bobcat to lumbering black bear. Here, tannic St. Johns River water fills the sandy riverside print of a white-tailed deer that recently quenched its thirst.

Largemouth Bass

The largemouth bass is one of the top draws of sportsmen to the St. Johns River. There are lunker bass in excess of 10 pounds that hang out in and around Lake George, a fisherman's dream destination. This largemouth bass swims in the clear waters of Silver Glen Spring, a tributary of the St. Johns.

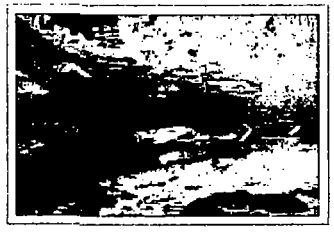
Common Tern

Near the Georgetown Marina a common tern dives and dips with precision into the tannin ripples of the St. Johns River, securing for itself a tasty fish dinner.

Eelgrass

Aquatic plants like eelgrass, which oxygenate the water through photosynthesis, play a vital role in the

St. Johns by providing food and shelter for numerous species. Here, in the Silver Glen Spring tributary, mullet swim above an eelgrass bed. Though darker with tannins, the St. Johns supports healthy eelgrass colonies, too.

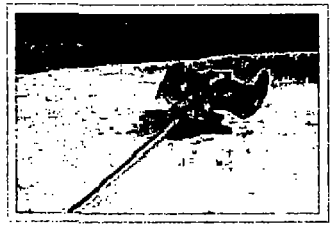


Striped Bass

Normally associated with a saltwater environment, striped bass are found in the St. Johns as far inland as Lake George, the southernmost extent of tidal influence on the river. Here, striped bass circle the springhead at Silver Glen, seeking and finding cool refuge from the river's warmer summer temperatures.

Bream and Sand Boil

The term "bream" is the common collective name for a number of Florida's panfish, including bluegills and sunfish. Here, near Silver Glen Spring, a bream hovers above a "sand boil." A small spring just below the sand surface keeps sand grains percolating, forming a "boil" of sand.



Stingray

In the clear waters of Silver Glen Spring, an Atlantic stingray cruises the sand bottom in search of small crustaceans to eat. Common throughout the St. Johns River system, the stingray is a saltwater species that, uniquely enough, makes its home year round in the river.

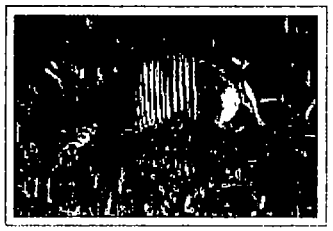
Longleaf Pine Forest

The Ocala National Forest, a huge expanse of longleaf pines, saw palmetto, and scrub, lies on the east bank of the St. Johns River, affording a protective buffer from development in the middle basin area. This area is prime habitat for bald eagles, among other species.

Leaping Mullet

In the quiet of an early morning or late afternoon, the St. Johns River comes alive with leaping mullet,

their distinctive splashes punctuating the silence in every direction at once. It's difficult to catch a mullet -- especially with a camera -- as the fish graze on aquatic grasses.



Armadillo

The comical appearance of an armadillo, the closest relatives of which are sloths and anteaters, provides an unexpected distraction from sightings of the more common St. Johns creatures such as mosquitoes, gators, and wading birds.

Ibis

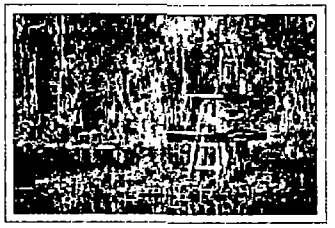
Once numbering in flocks of tens of thousands, the white ibis is considered a threatened species because of over-hunting and habitat destruction. There's probably no better place in the world to see great numbers of them than the St. Johns corridor, where their appearance is fairly common.

Bald Eagle

The best viewing spots on the river for bald eagles occur in the middle basin of the St. Johns, particularly around the Ocala National Forest and Lake George. This majestic raptor, a keystone species at the top of the food chain, has made a remarkable comeback in Florida, particularly along the St. Johns.

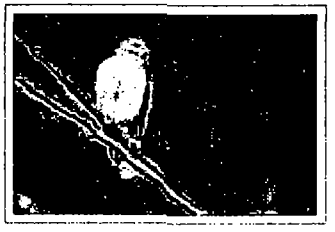
Manatee

A manatee in Blue Spring Run approaches an underwater cameraman with seeming curiosity. Though plentiful during the winter in Blue Spring Run, where they seek a warm water spring refuge from the colder St. Johns River, the manatee population as a whole is under pressure from habitat loss and boat strikes.



Floating Water Plants

A thick floating mat of aquatic plants, including water hyacinth and dollar weed, clings to the pilings of a channel marker. Invasive vegetation such as hyacinth and hydrilla -- a southeastern Asia native used in aquariums - are common and a pervasive problem along the river.



Red-Shouldered Hawk

The cry of the red-shouldered hawk can be heard up and down the length of the St. Johns. It's one of a number of raptors that call this river home.

Limpkin

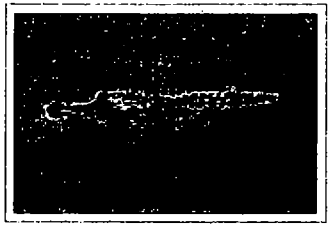
The limpkin, a solitary wading bird, once thrived in the marshes and swamps of the St. Johns River; its numbers are less plentiful now because of habitat loss and diminished availability of its primary food source, the apple snail. The limpkin's bloodcurdling shriek has been likened to a woman's scream.

Red-bellied turtle

"Cooters" are what the locals call turtles. Up and down the length of the St. Johns and tributaries such as the Wekiva, red-bellied turtles wile away their days balanced on logs and catching tropical rays.

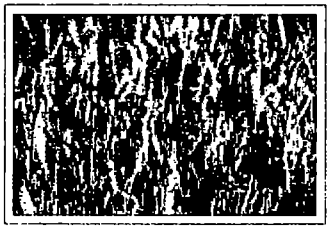
Sabal Palms

The sabal palm is Florida's state tree; it's also known as the cabbage palm. A common feature of the St. John River basins, it's especially prolific in the southern regions of the river.



Alligator

Alligators are a common site throughout the St. Johns River system, but some places have a greater concentration of these toothy reptiles than others Gators are estimated to number around 10,000 in Lake Jesup, for instance.

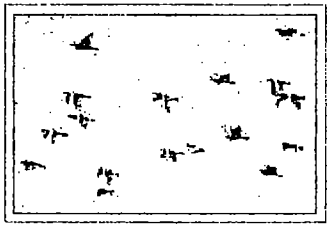


Pickerel Weed

As the river's personality changes from a single discernable main stem into a braid of channels, it flows through grassy marshes that bloom with aquatic plants such as the pickerel weed.

Dragonfly

The St. Johns basin is aflutter with insects ranging from iridescent-winged dragonflies to colorful butterflies, but it's the mosquito that reigns supreme here, in terms of numbers and reputation.



Cattle Egret Flock

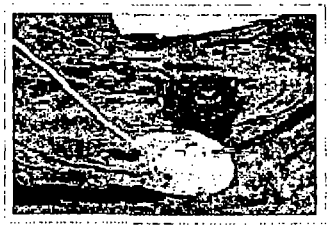
The north-flowing St. Johns River is a flyway for lots of flocks, everything from egrets (pictured here) to cranes. Thus it is a birdwatchers' paradise. Common as they are now, egrets were almost hunted out of existence back when the millinery industry paid top dollar for fashionable feathers.

Common Arrowhead

The showy bloom of the common arrowhead rises head and shoulders above other aquatic plants in the marshes of the St. Johns' headwaters region.

River Otter

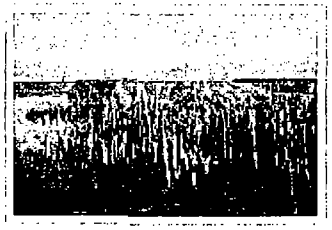
The sighting of a river otter on the St. Johns is enough to make even the crustiest old steamboat captain



want to stop and admire their sleek swimming, if not join in their frolicking fun. Otters are found from the headwaters in the south to the tributaries of the northern parts of the river.

Sandhill Cranes

During cold months, the migratory sandhill crane finds a hospitable winter habitat in the marshy headwaters region of the St. Johns River. Sometimes a rare and solitary whooping crane can be seen hanging out on the periphery of a noisy sandhill flock.



© St. Johns River Water Management District

Cattails

Although the ubiquitous cattail looks perfectly at home in the St. Johns River landscape, it actually doesn't belong. An indicator of high nutrient levels in the water, cattails are symptomatic of a system that's out-of-balance; they overtake native aquatic grasses that serve as nurseries for fish.

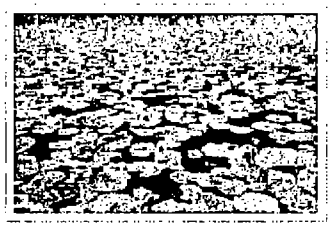
© Arthur Morris - BirdsAsArt.com

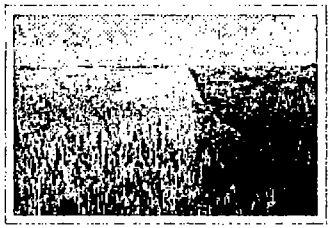
Everglades Snail Kite

A hawk-like snail kite perches with a tasty apple snail in its talons. Loss of sawgrass habitat and wildly manipulated water levels caused a dangerous decline in its population. Snail kites are reappearing in the headwaters of the St. Johns, a hopeful sign of the river's restoration.

Lily Pads

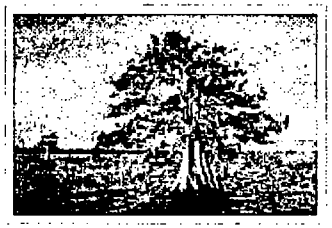
Near the headwaters of the St. Johns, the drainage ditches have been filled and pastures restored to wetlands. As a result, yellow-flowered lilypads bloom with abandon where cattle once grazed, providing habitat and food for countless insects, crustaceans, fish and birds.





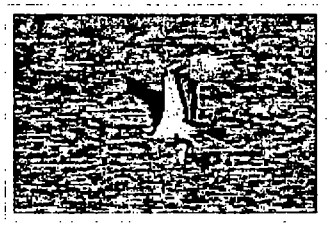
Sawgrass Marsh

An airboat trail cuts a narrow swath through acres upon acres of sawgrass marsh. This rare but vital remnant of sawgrass thrives just outside of the Everglades, in the headwaters region of the St. Johns River.



Bald Cypress

Huge and ancient bald cypress were wantonly clear-cut by loggers at the turn of the century. Trees such as this one, with its feet submerged in the tannin water, are now protected on public lands throughout the St. Johns River system.



Osprey

Common throughout much of the river basin, osprey are particularly plentiful in and around Blue Cypress Lake where as many as 100 nesting pairs come to build impressive twig nests which get bigger each successive season. Here, the raptors' cries are as constant as the lapping of water against cypress.

Karst PRODUCTIONS

The Water's Journey: The River Returns film is an original film by Karst Productions, Inc.

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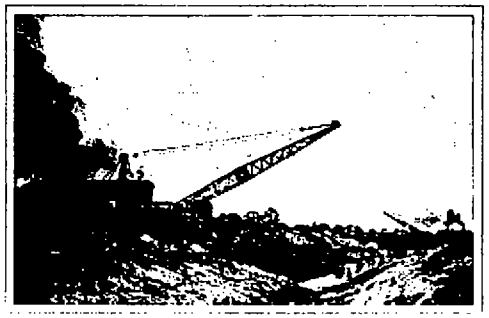
20th Century

Pre-History | 16th-18th Centuries | 19th Century | 20th Century | 21th Century
Visit the main River Returns web site >>

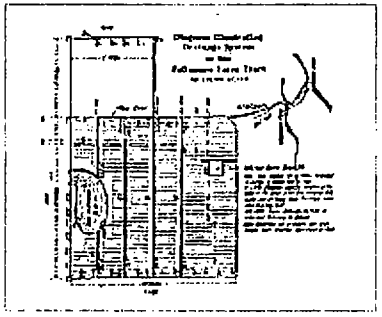


© Florida Memory Project

Early 1900s

Draining of The Headwaters Begins

Throughout the early 1900s, a network of private canals, ditches and levees were carved through the marshes of the Upper St. Johns River Basin, draining the wetlands and converting more than 70 percent of its headwaters into agricultural and urban lands.



© Ditches and Dreams: Nelson Fell and the Rise of Fellsmere / Florida Heritage Collection

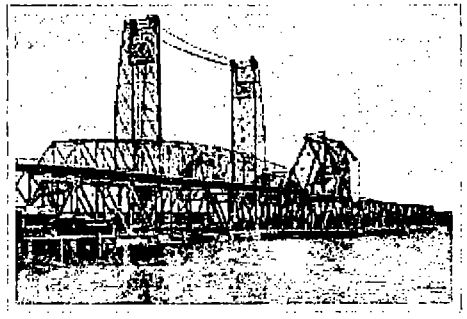
1915

Fellsmere Farms Fails

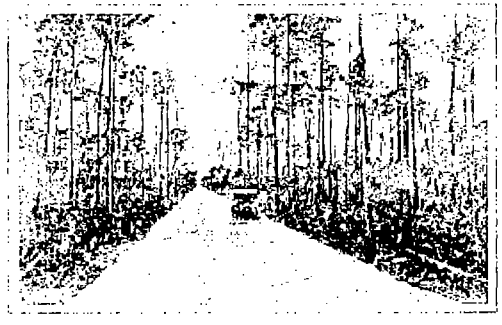
Nelson Fell, a hydraulic engineer from England, created the Fellsmere Farms Company and attempted to drain a 450-square-mile parcel of the river's headwaters for farming. In 1915 - after digging 67 miles of canals and 215 miles of ditches - two days of rain flooded the town of Fellsmere and destroyed much of the drainage system that kept the wetlands arable. Fellsmere never recovered.

1921

The First Car Bridge in Jacksonville



In 1921, the first vehicle and pedestrian bridge was built across the river in Jacksonville. For centuries, people had experienced the St. Johns River by traveling its surface in boats for sustenance, trade and tourism. From this point onward, the most common human experience with the river would be one of crossing over it.



1925

A Tourism and Real Estate Boom

A Suniland magazine article touted Florida's comfortable hotels and the tropical sunshine at the "utopian Land's End of the U.S." Prose such as this, aided by 11,000 miles of improved roads, created a tourism and real estate boom in Florida, including the St. Johns River region, which reached its peak just before the Great Depression.

1942

Marjorie Kinnan Rawlings

In the 1930s, Pulitzer Prize winning author Marjorie Kinnan Rawlings explored the St. Johns River in a small boat. In her book Cross Creek, published in 1942, Rawlings wrote of her beloved river: "If I could have, to hold forever, one brief place of time and beauty, I think I might choose the night on the high lonely bank above the St. Johns River."

1954

Congress Authorizes Flood Control Project

The loss of floodplain marshes in the Upper St. Johns due to drainage canals resulted in devastating floods from hurricanes in the 1920s and 1940s. In 1954, Congress authorized flood-control projects in the Upper St. Johns Basin. During the next two decades the Army Corps of Engineers would build a canal system delivering huge volumes of freshwater into the Indian River,

a saltwater lagoon.

1964

Disney World Comes to Florida

Walt Disney set his sites on Florida, a place where land was cheap, the weather was warm and people were eagerly going to live or to vacation. Quietly, under dummy corporations, Disney bought 27,000 acres - about twice the size of Manhattan. Disney World was born and when word got out area land prices jumped from $183 per acre to over $1,000 per acre. Orlando, then a quiet town of 20,000 people surrounded by orange groves and wetlands, would never be the same again.

1971

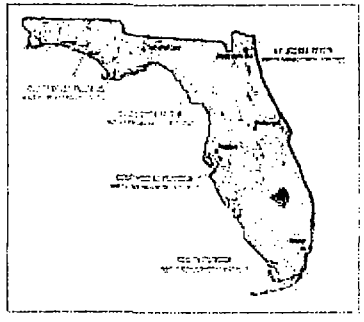
Jacques Cousteau Films Manatees

Jacques Cousteau filmed manatees at Blue Springs on the St. Johns River, a major winter habitat for the marine mammals. The documentary, "The Forgotten Mermaids," helped focus international attention on the plight of manatees and was a catalyst for the State's purchase of Blue Springs and several hundred acres of land along the river.

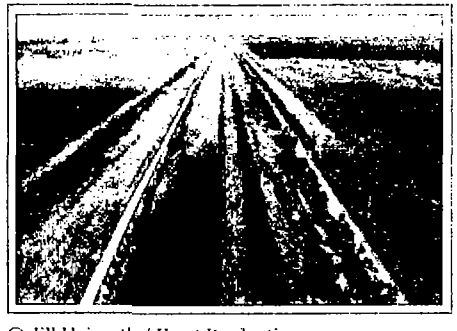
1972

The Water Resources Act

To manage all freshwater resources in Florida, the Water Resources Act was passed, establishing five water management districts in Florida, among them the St. Johns River Water Management District, covering about 23 percent of Florida's area.



© St. Johns River Water Management District

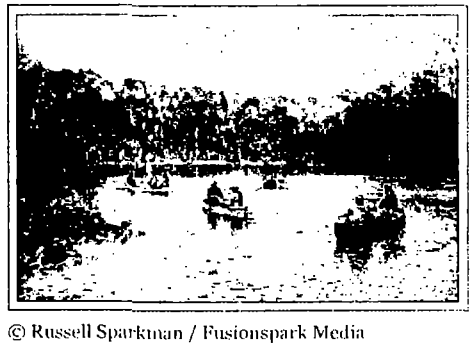


© Jill Heinerth / Karst Productions

1974

Flood Control Project Is Halted

The Army Corps of Engineers flood control project authorized in the '50s for the Upper St. Johns River Basin was halted when it was determined to be harmful to the environment of the Indian River Lagoon.



© Russell Sparkman / Fusionspark Media

1975

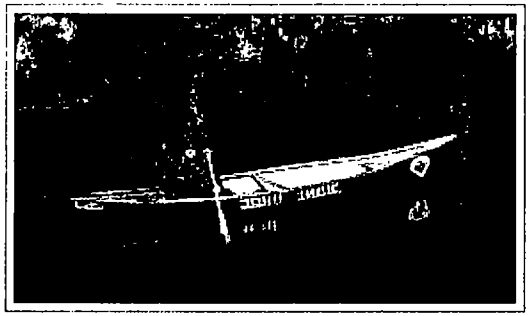
The Aquatic Preserve Act

Florida established the Aquatic Preserve Act, protecting the aesthetic, biological and scientific values of its waterways for the enjoyment of future generations. Two of the St. Johns River's major tributaries - the Wekiva and the Oklawaha Rivers, including a 20 mile stretch of the St. Johns - received protection.

1978

The Manatee Sanctuary Act

The Manatee Sanctuary Act declared the entire state of Florida as a refuge and sanctuary for the East Indian Manatee, or sea cow. The act regulated boat speeds on



© Russell Sparkman / Fusionspark Media

the St. Johns and established Blue Springs State Park as a designated protection zone.

© Russell Sparkman / Fusionspark Media

1988

Restoration of the Upper St. Johns Begins

A decade after planning started, two agencies - the St. Johns River Water Management District and the Army Corps of Engineers - began restoration of 150.000 acres of the Upper St. Johns River through land acquisition and by plugging drainage canals and building reservoirs. These actions provided flood control while also restoring the sheet flow of water through the river's headwaters. This restoration project became a model for Everglades restoration.

© Russell Sparkman / Fusionspark Media

1990

Citizen Groups Protect the River

The Stewards of the St. Johns River, a coalition of citizens, was organized to increase the public's awareness of health and quality issues related to the St. Johns River. The Stewards are one of several private or non-profit groups, including the St. Johns Riverkeeper and the Florida Defenders of the Environment, working to preserve and protect the St. Johns River.

1991

Stick Marsh and Farm 13

As a component of the Upper St. Johns River restoration project, the St. Johns River

© Russell Sparkman / Fusionspark Media

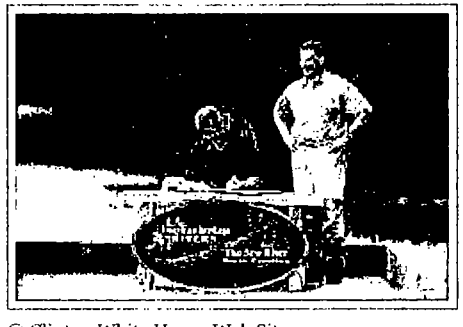
Water Management District created a 6,500-acre reservoir to help filter runoff from, and provide irrigation water to, agricultural areas. The area, known as Stick Marsh and Farm 13, opened to fishing in 1991 and has become one of Florida's premier bass fishing spots.

No Image Available

1997

The First River Summit

The first River Summit drew hundreds of citizens, business leaders and government officials to discuss issues related to water quality in the Lower St. Johns River Basin. As a result, projects were developed to reduce point and non-point pollution, restore degraded habitat, reduce bacteria in tributaries and improve water quality compliance and enforcement.



© Clinton White House Web Site

1998

American Heritage River Designation

President Clinton designated the St. Johns River an American Heritage River, one of only 14 rivers so recognized in the country and the only one in Florida. The designation inspired the forming of the St. Johns River Alliance in 2003, a non-profit public-private partnership organized to protect the river.

No Image Available

1999

The Florida Forever Act

Nine years after former Governor Bob Martinez's government determined that the state would lose three million acres of wetlands and forests to "other uses" by the year 2020, Governor Jeb Bush signed the Florida Forever Act. The 10-year, $3 billion program allows the state to acquire and improve lands and water areas, and opened the way for the state to purchase and protect land along the St. Johns River.

1999

The Watershed Restoration Act

The Watershed Restoration Act of 1999 authorized the Department of Environmental Protection to administer and coordinate the state's Total Maximum Daily Load (TMDL) program. Setting TMDLs, a requirement of the federal Clean Water Act of 1972, establishes maximum amounts of pollutants a watershed like the St. Johns River can assimilate and provides agencies with standards of measurement for watershed management.

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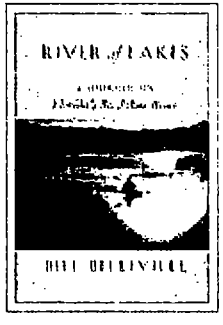
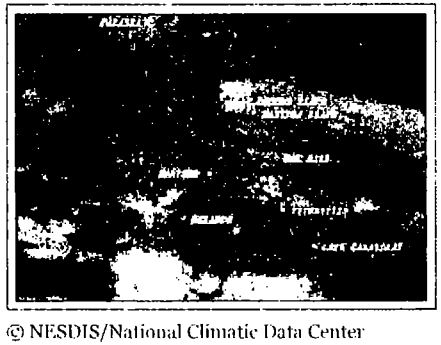


2000

"River of Lakes" is Published

In 2000, River of Lakes: A Journey on Florida's St. Johns River, by author and adventurer Bill Belleville, was published. The Miami Herald described it as the "definitive book on the St. Johns." The last book to be similarly described was William Bartram's Travels - which was published in 1791.

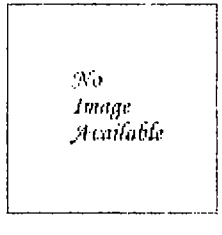


© NESDIS/National Climatic Data Center

2000

Drought and Wildfires

Florida experienced its driest year on record during a drought dating back to 1998, the worst drought period in the State since the 1930s. The dry weather, which continued several more years, fueled severe wildfires as well as a search for alternative drinking and irrigation water sources. One potential source: the St. Johns River.

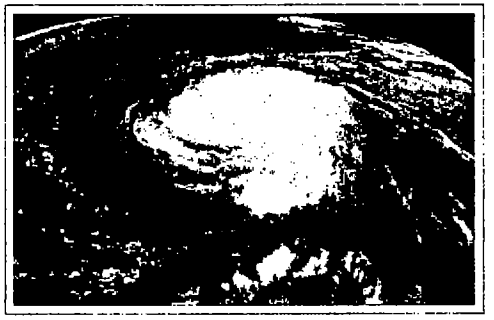


2003

Mercury and Health Advisories

A report published by The Florida Public Interest Group ranked Florida No. 2 among states for the most lake acreage with posted mercury pollution warnings and No. 6 for miles of rivers covered by fish consumption advisories due to mercury pollution. Florida's Division of Environmental Health issues ongoing fish consumption

advisories for many water bodies, including the St. Johns River.



© NOAA/Department of Commerce

2004

Three Hurricanes Hit Florida

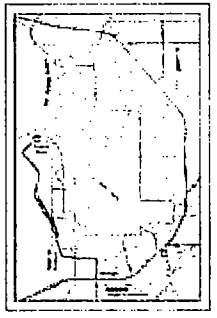
Three back-to-back hurricanes hammered the St. Johns River watershed with high winds and heavy rains. The river flooded along its length, in places causing septic systems to overflow, roads to crumble and people to lose their homes. However, flood controls built as a part of the restoration of the Upper St. Johns River basin performed as designed.

No Image Available

2005

Total Maximum Daily Loads

The Florida Department of Environmental Protection presented its first five-year report on the Total Maximum Daily Load (TMDL) program to the legislature and Governor. The report identified multi-agency efforts to establish TMDLs for waterways and practices that minimize non-point source pollution from agricultural and non-agricultural sources as positive outcomes of the initiative.



© St. Johns River Water Management District

2005

State Purchases St. Johns River Propery

The Florida Department of Environmental Protection announced plans to purchase 731 acres of the last remaining, undeveloped stretch of shoreline in the Lower St. Johns River Basin, making it the first Florida Forever purchase of land along the St. Johns River. The property, to be managed by the St. Johns River Water Management District, is located in one of the fastest growing counties in Florida.

Karst
PRODUCTIONS

The Water's Journey: The River Returns film
is an original film by Karst Productions, Inc.

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